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FUNDAMENTALS OF INSTRUCTING
and
GROUND INSTRUCTOR BASIC — ADVANCED

Question Book

1986

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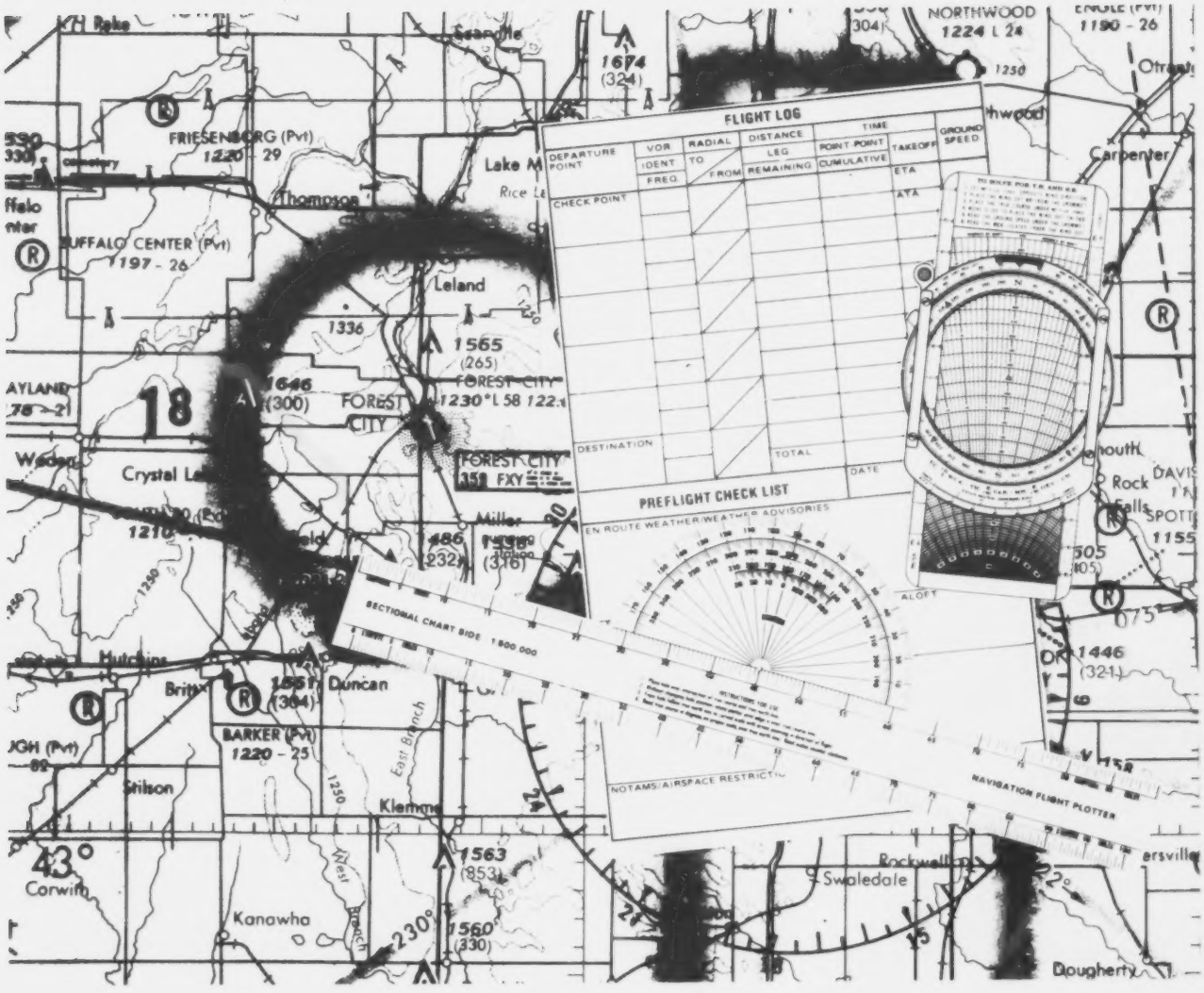

U.S. Department of Transportation
Federal Aviation Administration

Expires September 1, 1988

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and
GROUND INSTRUCTOR BASIC — ADVANCED

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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Aviation Standards National Field Office

READEX FICHE

MAXIMUM TIME ALLOWED FOR TEST:

Fundamentals of Instructing	—	**4 Hours**
Basic Ground Instructor	—	**4 Hours**
Advanced Ground Instructor	—	**4 Hours**

Materials to be used with this question book when used for airman testing:

1. Airman Written Test Application which includes the answer sheet.
2. Question Selection Sheet which identifies the questions to be answered.
3. Plastic overlay sheet which can be placed over performance charts for plotting purposes.

GENERAL INSTRUCTIONS

1. Read the instructions on page 1 of the Airman Written Test Application and complete the form on page 4.

2. The question numbers in this question book are numbered consecutively beginning with No. 4001. Refer to the question selection sheet to determine which questions to answer.

3. For each item on the answer sheet, find the appropriate question in the book.

4. Mark your answer in the space provided for that item on the answer sheet.

5. Remember:

   Read each question carefully and avoid hasty assumptions. Do not answer until you understand the question. Do not spend too much time on any one question. Answer all of the questions that you readily know and then reconsider those you find difficult. Be careful to make necessary conversions when working with temperatures, speeds, and distances.

If a regulation or operations procedure is changed after this question book is printed, you will receive credit until the affected questions are revised.

THE MINIMUM PASSING GRADE IS 70.

WARNING

§ 61.37 Written tests: cheating or other unauthorized conduct.

(a) Except as authorized by the Administrator, no person may—

(1) Copy, or intentionally remove, a written test under this Part;

(2) Give to another, or receive from another, any part of copy of that test;

(3) Give help on that test to, or receive help on that test from, any person during the period that test is being given;

(4) Take any part of that test in behalf of another person;

(5) Use any material or aid during the period that test is being given; or

(6) Intentionally cause, assist, or participate in any act prohibited by this paragraph.

(b) No person whom the Administrator finds to have committed an act prohibited by paragraph (a) of this section is eligible for any airman or ground instructor certificate or rating, or to take any test therefor, under this chapter for a period of one year after the date of that act. In addition, the commission of that act is a basis for suspending or revoking any airman or ground instructor certificate or rating held by that person.

PREFACE

This question book has been developed by the Federal Aviation Administration for use by applicants who are preparing for the Fundamentals of Instructing and Basic or Advanced Ground Instructor written test and also for use by Federal Aviation Administration Testing Centers and Federal Aviation Administration Designated Written Test Examiners in administering these tests. It is issued as FAA–T–8080–4A, Fundamentals of Instructing and Ground Instructor Basic — Advanced Question Book and is available from:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

or from U.S. Government Printing Office Bookstores located in major cities throughout the U.S.

The questions included in this publication are predicated on regulations, principles, and practices that were valid at the time of publication. The question selection sheets prepared for use with this question book are security items and are revised at frequent intervals.

The Federal Aviation Administration does not supply the correct answers to questions included in this book. Students should determine the answers by research and study, by working with instructors, or by attending ground schools. The Federal Aviation Administration is NOT responsible for either the content of commercial reprints of this book or the accuracy of the answers they may list.

Comments regarding this publication should be directed to:

U.S. Department of Transportation
Federal Aviation Administration
Aviation Standards National Field Office
Examinations Standards Branch
Operations Standards Section, AVN–131
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FUNDAMENTALS OF INSTRUCTING
and
GROUND INSTRUCTOR BASIC — ADVANCED

INTRODUCTION

This book follows the new concept in presenting Federal Aviation Administration written tests to applicants for the Fundamentals of Instructing and Basic or Advanced Ground Instructor examinations. Under this new concept, aeronautical knowledge subjects appropriate to each test are included under one cover. Question selection sheets are used to administer the proper written test to each applicant. Each test is constructed from items in this book listed under Appendix 1.

The planned revision cycle is 24 months for the question book and 12 months for the associated question selection sheets. Each question book and selection sheet is dated to indicate its expiration date.

THE WRITTEN TEST

Questions and Scoring

The test questions are of the multiple-choice type. Answers to questions listed on the question selection sheet should be marked on the answer sheet of AC Form 8080-3, Airman Written Test Application. Directions should be read carefully before beginning the test. Incomplete or erroneous personal information entered on this form delays the scoring process.

The answer sheet is sent to the Mike Monroney Aeronautical Center in Oklahoma City where it is scored by electronic computer. Shortly thereafter AC Form 8080- 2, Airman Written Test Report, is sent to the applicant listing the score and test questions missed.

The applicant must present this form when applying for an instructor certificate. This form must also be presented when retesting in the event of a written test failure.

Taking the Test

The test may be taken at Federal Aviation Administration testing centers, Federal Aviation Administration written test examiners' facilities, or other designated places. After completing the test, the applicant must surrender the issued question book, question selection sheet, answer sheet, and any papers used for computations or notations, to the monitor before leaving the test room.

When taking the test, the applicant should keep the following points in mind:

1. Answer each question in accordance with the latest regulations and procedures.
2. Read each question carefully before looking at the possible answers. You should clearly understand the problem before attempting to solve it.
3. After formulating an answer, determine which of the alternatives most nearly corresponds with that answer. The answer chosen should completely resolve the problem.
4. From the answers given, it may appear that there is more than one possible answer; however, there is only one answer that is correct and complete. The other answers are either incomplete or are derived from popular misconceptions.
5. If a certain question is difficult for you, it is best to proceed to other questions. After the less difficult questions have been answered, return to those which gave you difficulty. Be sure to indicate on the question selection sheet the questions to which you wish to return.
6. When solving a computer problem, select the answer nearest your solution. The problem has been checked with various types of computers; therefore, if you have solved it correctly, your answer will be closer to the correct answer than to any of the other choices.
7. To aid in scoring, enter personal data in the appropriate spaces on the test answer sheet in a complete and legible manner. Enter the test number printed on the question selection sheet.

NOTE: Blank spaces appear on several pages of this publication. This permits referenced figures and tables to appear as close as possible to their related questions.

APPENDIX 1

4001. A change in behavior as a result of experience can be defined as

1—motivation.
2—learning.
3—habit.
4—understanding.

4002. Which of these learning experiences would be the most effective in the learning process?

1—Those in which the student need only commit something to memory.
2—Experiences which involve the student's feelings, thoughts, and memories of past experiences.
3—Experiences which are totally new and unrelated to the learner's previous experiences.
4—Those which present a minimum challenge to the student.

4003. A student's readiness to learn and understand the requirements involved in the learning situation are affected most by the

1—student's past experiences.
2—student's intellectual level.
3—degree of difficulty involved in learning.
4—goals and incentives of other students in the class.

4004. The law of exercise is the basis of

1—practice and drill.
2—the emotional, reaction of the learner.
3—learning to do things right the first time.
4—learning by rote.

4005. Learning is strengthened when accompanied by a pleasant or satisfying feeling. This principle is the

1—law of primacy.
2—law of effect.
3—law of recency.
4—law of intensity.

4006. Which law of learning implies that a student will learn more from the real thing than from a substitute?

1—Law of primacy.
2—Law of intensity.
3—Law of recency.
4—Law of effect.

4007. Teaching the student to perform a task right the first time is an example of the

1—law of primacy.
2—law of recency.
3—law of effect.
4—law of readiness.

4008. Which law of learning is recognized when an instructor carefully plans a summary for a ground school lesson or a postflight critique?

1—Law of exercise.
2—Law of effect.
3—Law of recency.
4—Law of intensity.

4009. Which law of learning states that learning is weakened when associated with an unpleasant feeling?

1—Law of effect.
2—Law of intensity.
3—Law of primacy.
4—Law of readiness.

4010. If a student has a strong purpose, a clear objective, and a well-fixed reason for learning something, it is the result of the law of

1—primacy.
2—intensity.
3—effect.
4—readiness.

4011. Things most often repeated are best remembered because of which law of learning?

1—Law of recency.
2—Law of primacy.
3—Law of intensity.
4—Law of exercise.

4012. The dominant force which governs the student's progress and ability to learn is

1—motivation.
2—perception.
3—insight.
4—physical organism.

4013. Which of these may produce fears and be accepted by the student as threats?

1—Tangible motivations.
2—Intangible motivations.
3—Positive motivations.
4—Negative motivations.

4014. To promote efficient learning, the instructor should use

1—only negative motivators.
2—positive motivators rather than negative motivators.
3—negative motivators more often than positive motivators.
4—positive and negative motivators as equally as possible.

4015. Which of these is a form of negative motivation?

1—The promise or achievement of rewards.
2—Reproof and threats.
3—The belief that success is possible under certain circumstances.
4—Realizing that certain actions and operations may prevent injury or loss of life.

4016. Which statement is true concerning motivations?

1—Negative motivations characteristically are as effective as positive motivations.
2—Motivations may be very subtle and difficult to identify.
3—There is little or no motivation in menial tasks such as digging a ditch.
4—Motivations must be tangible to be effective.

4017. Select the correct statement pertaining to motivation.

1—Slumps in learning are often due to slumps in motivation.
2—The desire for personal gain is a form of negative motivation.
3—Motivation has little to do with learning.
4—Negative motivations are as effective in promoting efficient learning as are positive motivations.

4018. An instructor may foster the development of insights by

1—always keeping the rate of learning consistent so that it is predictable.
2—introducing the student to at least two new tasks during each lesson.
3—pointing out the attractive features of the activity to be learned.
4—helping the student acquire and maintain a favorable self-concept.

4019. Select the true statement concerning negative self-concepts.

1—Negative self-concepts should be considered an asset to learning because they favorably affect the "ability to do."
2—Negative self-concepts may be used to the advantage of an instructor who has a good understanding of psychology.
3—Negative self-concepts may inhibit the ability of the student to properly implement that which is perceived.
4—Negative self-concepts may be helpful because positive experiences often tend to contradict or destroy the self-concept.

4020. In the learning process, fear or the element of threat will

1—intensify the student's desire to improve performance.
2—narrow the student's perceptual field.
3—improve the student's ability to cope with the learning situation.
4—accelerate the attainment of perceptions.

4021. Which statement is true about the perceptual process?

1—Negative self-concepts have little or no effect on the perceptual process.
2—An individual's beliefs and value structures have no effect on perceptions.
3—All perceptions are affected by the need to preserve and perpetuate one's self.
4—Fear favorably affects perceptions by widening a person's perceptual field.

4022. Perceptions result when a person

1—responds to visual cues first, then aural cues, and relates these cues to ones previously learned.
2—groups together bits of information.
3—gives meaning to sensations being experienced.
4—responds correctly to self-evaluation.

4023. Motivations in the form of reproof and threats should be avoided with all but the student who is

1—timid and shy.
2—overconfident and impulsive.
3—bored or disinterested.
4—slow or discouraged.

4024. Which of the following is generally the more effective way for the instructor to properly motivate students?

1—Reinforce their self-confidence by requiring no tasks beyond their ability to perform.
2—Appeal to their pride and self-esteem.
3—Provide positive motivations by the promise or achievement of rewards.
4—Maintain pleasant personal relationships with students, even though it may be necessary to lower standards at times.

4025. The factor which contributes most to a student's failure to remain receptive to new experiences or which creates a tendency to reject additional training, is the student's

1—negative self-concept.
2—basic needs.
3—goals and values.
4—physical organism.

4026. The student who has negative experiences which tend to contradict self-concepts is probably one who

1—is psychologically motivated for further training.
2—will tend to reject instruction.
3—attempts to suppress aggressive reactions.
4—compensates for a personality conflict with the instructor.

4027. Evoking student insights is one of the instructor's major responsibilities. This involves

1—the ability of a student to master the rote performance of a task that has been learned.
2—the analysis of a student by the instructor.
3—a student's immediate grasp of theoretical principles as they are taught in ground school.
4—the grouping of perceptions into meaningful wholes.

4028. Insights, as applied to learning, involve a person's

1—awareness of those processes which are not immediately apparent.
2—ability to recognize the reason for learning a procedure.
3—grouping of associated perceptions into meaningful wholes.
4—self-concept or self-image.

4029. Instruction, as opposed to the trial and error method of learning, is desirable because competent instruction speeds the learning process by

1—teaching the relationship of perceptions as they occur.
2—relieving the student of the task of self-evaluation.
3—emphasizing only the important points of training.
4—eliminating the practice of exploring and experimenting.

4030. A basic need that affects all of a person's perceptions is the need to

1—maintain and enhance the person's own organized self.
2—accomplish a higher level of learning.
3—avoid areas of any threat to success.
4—acquire a formal education.

4031. What is the basis of all learning?

1—Insight.
2—Perception.
3—Positive self-concept.
4—Motivation.

4032. The highest level of learning has been achieved when a person is able to

1—accurately repeat verbally what has been learned.
2—accomplish or perform each element of a procedure precisely.
3—understand each segment of a particular subject, procedure, or technique.
4—correlate an element which has been learned with other segments or blocks of learning or accomplishments.

4033. A person who has learned by rote is one who

1—can repeat back something which has been taught, without being able to understand what has been learned.
2—understands what has been taught.
3—has achieved the skill to apply what has been taught.
4—is able to associate an element which has been learned with other segments of learning.

4034. A leveling-off process or learning plateau in a student's progress is considered

1—normal and should be expected after an inital period of rapid improvement.
2—abnormal since it means that learning has ceased.
3—abnormal and should not be brought to the student's attention.
4—normal if it does not stay level for significant periods of effort.

4035. The lowest level of learning has been attained when the student

1—can repeat back something without understanding what has been learned.
2—can apply what has been taught.
3—understands what has been taught.
4—can associate an element which has been learned with other segments of learning.

4036. On a graph showing the typical progress in learning, the initial leveling off of the learning curve is called a

1—progress advance.
2—learning gradient.
3—progress reversal.
4—learning plateau.

4037. In levels of learning, what are the steps of progression?

1—Rote, understanding, application, correlation.
2—Understanding, rote, application, correlation.
3—Rote, understanding, correlation, application.
4—Rote, application, understanding, correlation.

4038. Which of these would be most profitable to a beginning student?

1—Evaluation of performance against a set standard.
2—Assignment of a grade on performance.
3—Early evaluation to predict eventual proficiency.
4—Constructive critique to help eliminate errors.

4039. Concerning the factors involved in remembering, which statement is true?

1—Repetition guarantees remembering.
2—Negativism promotes remembering.
3—Practice guarantees remembering.
4—Praise stimulates remembering.

4040. According to one theory, some forgetting is due to the practice of submerging an unpleasant experience into the subconscious. This is called

1—repression.
2—interference.
3—disuse.
4—blanking.

4041. One theory about forgetting is that an item is forgotten because a later experience has overshadowed it. This process is called

1—repression.
2—interference.
3—disuse.
4—blanking.

4042. Which of these best ensures recall of material on tasks that have been taught?

1—Negative motivations.
2—Meaningful teaching.
3—Rote learning.
4—Practice or mere repetition.

4043. Which statement is true about transfer of learning?

1—Positive transfer occurs if the learning of one skill interferes with retention or proficiency of another skill.
2—Negative transfer occurs when students interpret new things in terms of what they already know.
3—Positive transfer occurs when the learning of one skill helps the student learn another skill.
4—Negative transfer occurs when the process refutes the interference theory of forgetting.

4044. Things learned previously by the student may either help or hinder the current learning task. This process generally is called

1—correlation.
2—interference.
3—transfer of learning.
4—insight.

4045. To help the student achieve transfer of learning, the instructor should

1—make certain the student understands that what is learned can be applied to other situations.
2—encourage rote learning.
3—discourage the use of imagination and ingenuity in applying knowledge and skills.
4—use instructional material that precludes the formation of well-founded concepts and generalizations.

4046. Students should perform a maneuver or operation the right way the first few times, because

1—that is when habits are established.
2—it establishes the basis for evaluation of the students' overall performance.
3—it allows an earlier introduction of a new lesson.
4—it requires less supervision and coaching by the instructor.

4047. To ensure further learning and correct student performance after the completion of training, it is the instructor's responsibility to

1—allow incorrect performance at the beginning of training to get those errors out of the student's system.
2—proceed to the next learning task even though the more simple tasks are performed incorrectly.
3—accept improper habits during the early phase of training and correct these faults later.
4—insist on correct techniques and procedures from the outset of training.

4048. To ensure proper habits and correct techniques during training, an instructor should

1—use the building block technique of instruction.
2—introduce tasks which are difficult and challenging to the student.
3—always repeat subject matter the student has already learned.
4—expose the student to complex operations early in training to ensure basic tasks are being learned.

4049. Which generalization about motivated human nature has been made by noted psychologists?

1—The average human being does not inherently dislike work.
2—A human being will not exercise self-direction and self-control in the pursuit of committed goals.
3—It is human nature to shirk responsibility.
4—The capacity to exercise a relatively high degree of imagination, ingenuity, and creativity in solving common problems is rare in the human race.

4050. To enhance the instructor's relationship with students, an instructor should be aware that students have

1—a tendency to shirk responsibility, because people are inherently lazy.
2—relinquished their role as individuals while enrolled in training programs.
3—drives and desires that they continually try to satisfy in one way or the other.
4—feelings of insecurity when receiving criticism, whether constructive or not.

4051. Which of the student's human needs offers the greatest challenge to the instructor?

1—Social needs.
2—Safety needs.
3—Physical needs.
4—Self-fulfillment needs.

4052. After individuals are physically comfortable and have no fear for their safety, what then becomes the prime influence on their behavior?

1—Physical needs.
2—Egoistic needs.
3—Materialistic needs.
4—Social needs.

4053. Before a student can concentrate on learning, which of the human needs must be satisfied?

1—Physical needs.
2—Safety needs.
3—Social needs.
4—Self-fulfillment needs.

4054. Among the various human needs, which of these is the individual first concerned about?

1—Personal safety.
2—Self-fulfillment.
3—Social needs.
4—Physical needs.

4055. Although defense mechanisms can serve a useful purpose, they can also be a hindrance because they

1—alleviate the cause of problems.
2—destroy feelings of failure.
3—provide feelings of adequacy.
4—involve self-deception and distortion of reality.

4056. When a student asks irrelevant questions or refuses to participate in class activities, it usually is an indication of the defense mechanism known as

1—rationalization.
2—flight.
3—aggression.
4—resignation.

4057. Taking physical or mental flight is a defense mechanism that students use when they

1—cannot accept the real reasons for their behavior.
2—want to escape from frustrating situations.
3—become bewildered and lost in the advanced phase of training.
4—attempt to justify actions that otherwise would be unacceptable.

4058. When a student uses excuses to justify inadequate performance, it is an indication of the defense mechanism known as

1—rationalization.
2—flight.
3—aggression.
4—resignation.

4059. When students subconsciously use the defense mechanism called rationalization, they

1—cannot accept the real reasons for their behavior.
2—develop symptoms that give them excuses for removing themselves from frustration.
3—become aggressive against something or somebody.
4—no longer believe it profitable or even possible to work further.

4060. When students become so frustrated they no longer believe it profitable or even possible to work further, they usually display which defense mechanism?

1—Rationalization.
2—Flight.
3—Aggression.
4—Resignation.

4061. When a student becomes bewildered and lost in the advanced phase of training after completing the early phase without grasping the fundamentals, the defense mechanism is usually in the form of

1—rationalization.
2—flight.
3—aggression.
4—resignation.

4062. When students display the defense mechanism called aggression, they

1—may refuse to participate in the activities of the class.
2—attempt to justify actions that otherwise would be unacceptable.
3—develop symptoms or ailments that give them satisfactory excuses for removing themselves from frustration.
4—become so frustrated they lose interest and give up.

4063. When a student engages in daydreaming, it is the defense mechanism of

1—rationalization.
2—flight (escape).
3—aggression.
4—resignation.

4064. Which of these would more likely result in students becoming frustrated?

1—Telling the students that their work is unsatisfactory with no explanation.
2—Neglecting to tell students what is expected of them and what they can expect.
3—Failing to point out to students how a particular lesson or course can help them reach an important goal.
4—Covering up instructor mistakes or bluffing when the instructor is in doubt.

4065. What is the usual result when a student has made an earnest effort, but is told that the work is not satisfactory, with no other explanation?

1—Increased motivation.
2—Regression.
3—Frustration.
4—Increased effort.

4066. When the instructor keeps the student informed of lesson objectives and completion standards, it minimizes the student's

1—individuality.
2—motivation.
3—insecurity.
4—aggressiveness.

4067. Student confidence tends to be destroyed if instructors

1—bluff whenever in doubt about some point.
2—identify the student's errors and failures.
3—acknowledge their own mistakes.
4—direct and control the student's actions and behavior.

4068. Instructors who limit their thinking to the whole group without considering the individuals within that group are

1—using a good lecture technique.
2—assuming all students have an average personality which really fits no one.
3—using an excellent time-saving measure.
4—presenting information efficiently for maximum retention.

4069. In the communication process, if a listener has difficulty in understanding the symbols the speaker is using, and indicates confusion, the speaker

1—is encouraged and force is added to communication.
2—may become puzzled and uncertain.
3—should resort to the use of abstract words.
4—should avoid the use of concrete words.

4070. The effectiveness of communication between the instructor and the student is measured by the

1—similarity between the idea transmitted and the idea received.
2—facial expressions of the student during a lesson.
3—degree of attention the student gives to the instructor during a lesson.
4—level of motivation displayed by the student.

4071. In the communication process, a speaker is encouraged and force is added to communication when the listener

1—reacts favorably.
2—has difficulty in understanding and indicates confusion.
3—shows an attitude of passive neutrality.
4—has no experiences in common with the speaker.

4072. To communicate effectively, instructors must

1—reveal a positive and confident attitude while delivering their message.
2—depend on a highly technical or professional background to ensure acceptance of the message.
3—rely on technical language to express ideas clearly to students.
4—limit the method of communication to one channel (hearing, seeing, or feeling) to avoid confusion.

4073. Which statement is true regarding effective communication during student instruction?

1—Effective communication has taken place when information is provided in such a way that it changes the behavior of the student.
2—Effective communication has taken place when the student is able to repeat the information that has been received.
3—Effective communication is when the student has accurately received the information even though the factors and principles are not yet understood.
4—Effective communication at its best is when information is accurately transmitted and received.

4074. Effective communication has taken place when, and only when, the

1—sender uses a vocabulary (written or oral) that is meaningful to the reader or listener.
2—communicator has convinced the listener there is a need to know the ideas presented.
3—receiver has the ability to question and comprehend the ideas that have been transmitted.
4—receivers react with understanding and change their behavior accordingly.

4075. In the communication process, the communicator will be more successful in gaining and retaining the receiver's attention by

1—providing an atmosphere which discourages questioning.
2—varying the communicative approach.
3—presenting the message in a manner that is totally foreign to the receiver's experiences.
4—relying on technical language to express ideas to the receiver.

4076. By the use of abstractions in the communication process, the communicator will

1—narrow and gain better control of the image produced in the minds of listeners and readers.
2—not evoke in the listener's or reader's mind the specific items of experience the communicator intends.
3—be using words which refer to objects or ideas that human beings can experience directly.
4—bring forth specific items of experience in the minds of the receivers.

4077. The danger in using abstract words is that they

1—will not evoke the specific items of experience in the listener's mind that the communicator intends.
2—control the image produced in the listener's mind.
3—refer only to things that people are familiar with or can relate to.
4—are overly concise in their meanings.

4078. Probably the greatest single barrier to effective communication is the

1—confusion between the symbol and the thing symbolized.
2—use of abstractions by the communicator.
3—use of statements which contain inaccuracies.
4—lack of a common core of experience between communicator and receiver.

4079. Probably the greatest single barrier to effective communication in the teaching process is a lack of

1—personality harmony between instructor and student.
2—time available for communication.
3—a quiet environment.
4—a common experience level between the instructor and student.

4080. A communicator's words cannot communicate the desired meaning to another person unless the

1—listener or reader has had some experience with the objects or concepts to which these words refer.
2—words give the meaning that is in the mind of the receiver.
3—communicator makes extensive use of abstractions.
4—communicator avoids the use of words which relate to the receiver's past experiences.

4081. What is the proper sequence in which the instructor should employ the four basic steps in the teaching process?

1—Explanation, trial and practice, evaluation, and review.
2—Presentation, trial and practice, evaluation, and review.
3—Explanation, demonstration, practice, and evaluation.
4—Preparation, presentation, application, and review and evaluation.

4082. Which method of presentation is desirable for a lesson on a skill such as the use of a flight computer?

1—Formal lecture method.
2—Informal lecture method.
3—Demonstration/performance method.
4—Guided discussion method.

4083. In the teaching process, which method of presentation is suitable for presenting new material, for summarizing ideas, and for showing relationships between theory and practice?

1—Lecture method.
2—Guided discussion method.
3—Demonstration/performance method.
4—Integrated instruction method.

4084. Evaluation of student performance and accomplishment during a lesson should be based on the

1—student's background and past experiences.
2—student's actual performance as compared to a faultless performance.
3—direct comparison with the performance of other students in the class.
4—objectives and goals that were established in the lesson plan.

4085. To enhance a student's acceptance of further instruction, the instructor should

1—keep the student informed of the progress made.
2—emphasize the student's inabilities.
3—establish performance standards a little above the student's actual ability.
4—inform the student that others in the class are progressing faster.

4086. Which statement is true regarding student evaluation?

1—Evaluation of a student's learning should be an integral part of each classroom or flight lesson.
2—The preferred method of quizzing a student is by asking questions which can be answered by a "yes" or "no."
3—Tests should be developed in such a manner that no one can get a perfect score.
4—Ambiguous questions tend to force one to think, therefore, they are acceptable when evaluating students.

4087. The method of arranging lesson material from the simple to complex, past to present, and known to unknown, is one that

1—creates student thought pattern departures.
2—the instructor should avoid.
3—covers the areas only briefly in a normal discussion.
4—shows the relationships of the main points of the lesson.

4088. An instructor who uses the student's previous experiences and knowledge as a starting point and leads into new ideas and concepts, is teaching from the

1—least frequently used to most frequently used.
2—known to the unknown.
3—simple to complex.
4—most frequently used to least frequently used.

4089. When teaching from the known to the unknown, an instructor is using the student's

1—likes and dislikes.
2—previous experiences and knowledge.
3—anxieties and insecurities.
4—negative self-concepts.

4090. In organizing lesson material, which step should relate the coverage of material to the entire course?

1—Conclusion.
2—Development.
3—Summary.
4—Introduction.

4091. In developing a lesson, the instructor must logically organize explanations and demonstrations to help the student

1—understand the relationships of the main points of the lesson.
2—learn by trial-and-error practice of the procedures.
3—experience a minimum amount of difficulty in memorizing the steps of a procedure.
4—learn by rote so that performance of the procedure will become automatic.

4092. When a guided discussion is being conducted, the instructor should

1—remember that the more intense the discussion and the greater the participation, the more effective the learning will be.
2—make no comments during the discussion.
3—discourage students from asking questions.
4—never use a reverse question in response to a student's question.

4093. Which of these should be the first step in preparing a lecture?

1—Researching the subject.
2—Planning productive classroom activities.
3—Organizing the material.
4—Establishing the objective and desired outcome.

4094. In the teaching lecture, the use of which of these would detract from the instructor's dignity and reflect upon the student's intelligence?

1—Errors in grammar and vulgarisms.
2—Picturesque slang.
3—Free-and-easy colloquialisms.
4—Simple words.

4095. What is one advantage of a lecture?

1—It provides for student participation.
2—Many ideas can be presented in a short time.
3—Maximum attainment in all types of learning outcomes is possible.
4—It provides the instructor with an accurate means of monitoring student learning.

4096. When it appears students have adequately discussed the ideas presented during a guided discussion, one of the most valuable tools an instructor can use is

1—an interim summary of what the students accomplished.
2—a taped recording of the discussion.
3—an immediate recess or dismissal of the class.
4—a written test on the subject discussed.

4097. During a ground training session, how can the instructor more effectively stimulate group discussion?

1—Create an atmosphere of sternness.
2—Deliver a comprehensive lecture.
3—Select a subject in which students lack knowledge.
4—Create a generally relaxed, informal atmosphere.

4098. Learning is produced in a guided discussion through the skillful use of

1—questions.
2—demonstrations.
3—lectures.
4—negativism.

4099. Which statement about the guided discussion method of teaching is true?

1—Unless the students have some knowledge to exchange with each other, they cannot reach the desired learning outcomes.
2—Students without a background in the subject should be included in the discussion.
3—The more intense the discussion and the greater the participation, the less effective the learning will be.
4—The instructor should answer all student questions; never reverse or relay the questions to the class.

4100. Which of these questions would be best as a lead-off question for a guided discussion on the subject of torque?

1—In which direction does torque affect the airplane?
2—How does torque affect the airplane?
3—Does torque affect the airplane?
4—Are there four or five factors involved in torque?

4101. In preparing questions for a guided discussion, the instructor should remember that the purpose is to

1—get answers to student's questions.
2—bring about discussion to develop an understanding of the subject.
3—require that students research the topic.
4—evaluate and grade the student's knowledge.

4102. In a guided discussion, learning is produced through

1—tutorial instruction.
2—explanations and demonstrations.
3—discussion of a topic in which students have little or no background.
4—the skillful use of questions.

4103. Which type question should an instructor use to begin a guided discussion with a group of students?

1—Direct.
2—Relay.
3—Overhead.
4—Reverse.

4104. In the demonstration/performance method of instruction, which two separate actions are performed concurrently?

1—Instructor explanation and student demonstration.
2—Instructor demonstration and evaluation.
3—Student performance and instructor supervision.
4—Instructor explanation and evaluation.

4105. If, due to some unanticipated circumstances, the instructor's demonstration does not closely conform to the explanation, the instructor should

1—immediately acknowledge and explain the discrepancy.
2—disguise the discrepancy with unrelated instruction.
3—downplay or ignore the discrepancy as being unimportant to the demonstration.
4—lower the standards when the student performs the task.

4106. What are the essential steps in the demonstration/performance method of teaching?

1—Demonstration, student performance, and evaluation.
2—Explanation, demonstration, student performance, instructor supervision, and evaluation.
3—Motivation, presentation, summary, and closure.
4—Demonstration, practice, and evaluation.

4107. The instructor can best inspire active student participation in informal lectures through the use of

1—visual aids.
2—negative motivations.
3—humor.
4—questions.

4108. The distinguishing characteristic of an informal lecture is

1—the lack of a central idea.
2—the student's participation.
3—the use of visual aids.
4—the relative importance of the subject.

4109. Which teaching method provides no accurate means of checking student learning?

1—Guided discussion method.
2—Demonstration/performance method.
3—Lecture method.
4—Programmed instruction method.

4110. The teaching lecture is probably best delivered by

1—reading from a typed or written manuscript.
2—reciting memorized material without the aid of a manuscript.
3—speaking extemporaneously from an outline.
4—speaking impromptu without preparation.

4111. Which teaching method is particularly suitable for introducing a subject and is the most economical in terms of the time required to present a given amount of material?

1—Lecture method.
2—Guided discussion method.
3—Demonstration/performance method.
4—Programmed instruction method.

4112. The preferred method for conducting a teaching lecture is to

1—read from prepared material.
2—memorize the material to be presented.
3—speak extemporaneously from an outline.
4—speak impromptu with a minimum of specifics.

4113. In regard to the teaching lecture, which of these statements is true?

1—The teacher receives direct reaction from the student in the form of verbal or motor activity.
2—New ideas should be introduced in the conclusion of the lesson.
3—The instructor must develop a keen perception for subtle responses and must be able to interpret the meaning of these reactions.
4—Delivering the lecture in an extemporaneous or off-hand manner is not recommended.

4114. Which statement is true about an instructor's critique of a student's performance?

1—It is a step in the learning process, not in the grading process.
2—The critique should be subjective rather than objective in nature.
3—By its nature, a critique is necessarily negative in content.
4—The instructor's comments and recommendations should be general rather than specific.

4115. Which statement is true about instructors' critiques?

1—Instructors should rely on their position to make a critique more acceptable to their students.
2—Before students willingly accept their instructor's critique, they must first accept the instructor
3—Critiques must be inflexible and not allow for variables.
4—A comprehensive critique must treat every aspect of the student's performance in detail.

4116. The purpose of a critique of the student's performance is to

1—provide direction and guidance to raise the level of the student's performance.
2—instill student confidence in the instructor's ability and authority.
3—identify only the student's faults and weaknesses.
4—evaluate the student and assign a grade.

4117. When an instructor critiques a student, it should always be

1—conducted immediately after the student's performance.
2—done in private.
3—subjective rather than objective.
4—designed and executed so that the instructor cannot allow for variables.

4118. An instructor's critique of a student's performance should

1—identify only the faults and weaknesses.
2—treat every aspect of the performance in detail.
3—clearly express what was done well, what was done poorly, and how to improve the performance.
4—be conducted only in private.

4119. Which of these should be omitted from an instructor's critique of a student's performance?

1—The student's personal feelings.
2—Negative criticism that does not point toward improvement.
3—The student's strengths and successes.
4—Instruction in the form of direction and guidance.

4120. Which statement is true about an instructor's critique of a student's performance?

1—By its nature, a critique is necessarily negative in content.
2—It should be constructive and objective.
3—It should treat every aspect of the performance in detail.
4—The student's personal feelings should not enter into the critique.

4121. To be effective, a critique should

1—be flexible enough to satisfy the requirements of the moment.
2—reflect the personal opinions, likes, and dislikes of the instructor.
3—place more emphasis on a student's weaknesses.
4—treat every aspect of the performance in detail.

4122. When conducting a critique, the instructor should

1—cover all of the student's faults or weaknesses, large or small.
2—cover only a few well-made points rather than a large number of inadequately developed points.
3—emphasize the points covered with dogmatic and absolute statements.
4—praise the student before criticizing, even if undeserved.

4123. Of the following, which is a valid reason for the use of proper oral quizzing during a lesson?

1—It permits the instructor to devote more time to helping weak students rather than developing written tests.
2—It helps the instructor determine the general intelligence level of the students.
3—It is unnecessary to grade the results.
4—It promotes active student participation.

4124. During oral quizzing in a given lesson, effective questions should

1—relate to more than one thought or idea.
2—divert the student's thoughts to subjects covered in previous lessons.
3—include a combination of who, what, when, or where.
4—be brief and concise.

4125. In all quizzing as a portion of the instruction process, the questions should

1—include unrelated subject matter to increase total comprehension.
2—include catch questions to develop the student's perceptive power.
3—include questions with more than one central idea to evaluate how completely a student understands the subject.
4—call for specific answers and be readily evaluated by the instructor.

4126. Proper quizzing by the instructor during a lesson can have which of these results?

1—It identifies points which need more emphasis.
2—It permits the introduction of new material which was not covered previously.
3—It diverts the student's thoughts to unrelated subjects.
4—It develops a feeling in the student of matching wits with the instructor.

4127. If a student asks a question which the instructor cannot answer, the instructor should

1—tell the student to reintroduce the question later, to allow time for the instructor to research the answer.
2—inform the student the question is irrelevant and not pertinent to the subject being covered.
3—admit not knowing the answer and promise to get the answer or help find the answer.
4—tell the student to find the answer in available references.

4128. One desirable result of proper oral quizzing by the instructor is to

1—reveal the effectiveness of the instructor's training procedures.
2—establish a grade for the student.
3—fulfill the requirements set forth in the overall objectives of the course.
4—reveal the essential information from which the student can determine progress.

4129. To be effective in oral quizzing during the conduct of a lesson, a question should

1—center on only one idea.
2—divert the student's thoughts to subjects covered in other lessons.
3—be easy for the student at that particular stage of training.
4—include a combination of where, how, and why.

4130. To answer a student's question, it is most important that the instructor

1—have complete knowledge of the subject.
2—keep specifics to a minimum.
3—risk a guess rather than admit ignorance.
4—clearly understand the question.

4131. Which type of test item creates the greatest probability of guessing?

1—Supply.
2—Selection.
3—True–False.
4—Multiple choice.

4132. Which of the following is the main disadvantage of supply–type (essay) test items?

1—They cannot be graded with uniformity.
2—They do not require students to organize their knowledge.
3—They make it possible to directly compare student accomplishment.
4—They increase the probability of student guessing.

4133. The characteristic of a written test, which measures small differences in achievement between students, is its

1—reliability.
2—validity.
3—comprehensiveness.
4—discrimination.

4134. A written test has validity when it

1—actually measures what it is supposed to measure and nothing else.
2—yields consistent results.
3—samples liberally whatever is being measured.
4—measures small differences in the achievement of students.

4135. Which of the following principles should be followed in the development of true–false tests?

1—Establish patterns in the sequence of correct responses for easier scoring.
2—Include complex statements in the questions.
3—Include one or more ideas in each statement in the questions.
4—Avoid absolutes such as "all," "every," and "only."

4136. Which of the following is a characteristic of supply–type (essay) test items?

1—The test results would be graded the same regardless of the student or the grader.
2—The same test graded by different instructors would probably be given different scores.
3—The ability of the student to express ideas is not required.
4—The student's specific knowledge of subject matter is readily evaluated.

4137. When a written test shows positive discrimination, it will

1—include a representative and comprehensive sampling of the course objectives.
2—distinguish between the students who are low and those who are high in achievement.
3—sample liberally what is being measured.
4—not measure what is intended.

4138. A written test is said to be comprehensive when it

1—samples liberally whatever is being measured.
2—shows a wide range of scores.
3—includes all levels of difficulty.
4—measures knowledge of the same topic in many different ways.

4139. A written test which has reliability is one which

1—actually measures what it is supposed to measure and nothing else.
2—yields consistent results.
3—samples liberally whatever is being measured.
4—measures small differences in the achievement of students.

4140. One of the main advantages of selection–type (multiple choice) test items over supply–types (essay) test items, is that the selection–type

1—requires the ability of students to express ideas.
2—would be graded objectively regardless of the student or the grader.
3—requires students to organize their knowledge.
4—precludes comparison of students under one instructor with those of another instructor.

4141. Which statement is true relative to effective multiple-choice test items?

1—Students should be able to select the correct response with even slight knowledge of the subject.
2—Students should be able to select the correct response only if they know it is correct.
3—It is not ethical to mislead the unknowledgeable student into selecting an incorrect alternative.
4—Common errors or misconceptions should not be used as incorrect alternatives.

4142. Which of these is one of the major difficulties encountered in the construction of multiple-choice test items?

1—Adapting the items to statistical item analysis.
2—Keeping all responses approximately equal in length.
3—Inventing distractors which will be attractive to students lacking knowledge or understanding.
4—Phrasing the item in question form in lieu of incomplete statement form.

4143. Which statement is true about multiple-choice test items that are intended to measure achievement at a higher level of learning?

1—Some or all of the alternatives should be nearly correct but only one should be clearly correct.
2—The use of common errors as distracting alternatives to divert the student from the correct response is ineffective and invalid.
3—It is unethical to mislead the unknowledgeable student into selecting an incorrect alternative.
4—If there are less than four alternatives, the probability of guessing the correct response is decreased.

4144. In a written test, which type of test items makes it easier to compare the performance of students within the same class or in different classes?

1—Supply.
2—Selection.
3—True-False.
4—Essay.

4145. Which type test is desirable for evaluating training that involves an operation, procedure, or process?

1—Oral.
2—Written.
3—Performance.
4—Subjective written.

4146. Which is a true statement concerning the use of visual aids?

1—Visual aids should not be used to cover a subject in less time.
2—Only visual aids which conform to the instructor's past training and experience should be used.
3—Visual aids can be used to emphasize the key points in a lesson.
4—Visual aids ensure getting and holding the student's attention.

4147. Instructional aids used in the teaching/learning process should be

1—compatible with the learning outcomes to be achieved.
2—self-supporting and should require no explanation.
3—selected prior to developing and organizing the lesson plan.
4—designed to get the students' attention on the aid rather than the subject.

4148. Instructional aids used in the teaching/learning process should not be used

1—in conjunction with verbal presentations.
2—for teaching more in less time.
3—as a crutch by the instructor.
4—if detailed schematics are necessary to explain elaborate equipment.

4149. The use of instructional aids should be based on their ability to support a specific point in the lesson. What is the first step to determine if and where instructional aids are necessary?

1—Organize subject material into an outline or a lesson plan.
2—Gather necessary data by researching for support material.
3—Decide at what point in the lesson the student's interest must be rekindled.
4—Clearly establish the lesson objective, being certain what must be communicated.

4150. An instructor cannot retain the reputation of a professional if that person

1—gives the impression that interest in instruction is secondary to other activities.
2—instructs on a part-time basis.
3—does not demand higher pay.
4—accepts students as they are with all their faults and problems.

4151. At the beginning of the student's training and before each flight lesson during early dual instruction, the instructor should

1—avoid terms and phrases which are part of the language of aviation, since they are new and strange to the student.
2—define the terms and phrases which will be used during the forthcoming lesson.
3—use colloquial expressions of aviation frequently so the student can learn the language of aviation.
4—use picturesque expressions to brighten the instruction given.

4152. The professional relationship between the instructor and the student should be based upon

1—the mutual acknowledgment that they are important to each other and both are working toward the same objective.
2—the concept that making things easy for the student and accepting lower standards will improve the relationship.
3—the need to disregard the student's personal faults, interests, or problems.
4—the understanding that during the training course the instructor's objectives are different from the student's.

4153. Which statement is true regarding true professionalism as an instructor?

1—To achieve professionalism, actions and decisions must be limited to standard patterns and practices.
2—Anything less than sincere performance destroys the effectiveness of the professional instructor.
3—Professionalism is not necessarily based on intelligence or the ability to reason logically and accurately.
4—A single definition of professionalism would encompass all of the qualifications and considerations which must be present.

4154. Ridicule and reproof of a slow and apprehensive student are

1—effective if the student understands the reason for being criticized in this manner.
2—ineffective in encouraging learning.
3—generally an effective psychological tool because students will work to avoid unpleasant experiences.
4—effective because students learn best when mistakes are pointed out in a forceful manner.

4155. An instructor can most effectively maintain a high level of student motivation by

1—making things easy for the student.
2—setting performance standards to match the student's ability.
3—making each lesson a pleasant experience for the student.
4—conducting lessons which offer no rewards.

4156. What effect does making each lesson a pleasurable experience have on the student?

1—Maintains a high level of motivation.
2—Fosters complacency.
3—Tends to lower standards of performance.
4—Develops undesirable habit patterns.

4157. What should an instructor do if a student's slow progress is due to discouragement and a lack of confidence?

1—Assign subgoals which can be attained more easily than the normal learning goals.
2—Provide unlimited help and encouragement.
3—Raise the performance standards so that the student will gain satisfaction in meeting higher standards.
4—Emphasize the negative aspects of poor performance by pointing out the serious consequences.

4158. Which statement is true regarding positive or negative approaches in aviation instruction?

1—Negative approaches are generally more effective than positive approaches.
2—A positive approach is one which stresses all the critical possibilities of aviation before the potential and pleasurable features are presented.
3—The positive approach of introducing emergency procedures after the student is acquainted with normal operations is not likely to be discouraging or frightening for the student.
4—A positive approach will stress that a flight maneuver or procedure must be accomplished in a certain manner or serious consequences will result.

4159. Which statement is true regarding positive or negative approaches in aviation instructional techniques?

1—Negative approaches are more effective than positive approaches.
2—Positive approaches point out the pleasurable features of aviation before the critical possibilities are stressed.
3—To be effective, instructors should ignore the existence of negative factors.
4—A negative teaching approach generally results in positive learning.

4160. Which of these is an example of a positive approach in the first flight lesson of a student with no previous aviation experience?

1—Instruction in the extreme care which must be taken in taxiing an airplane, with the admonition "if you go too fast it's likely to get away from you."
2—A series of stalls, explaining that "this is how so many people lose their lives in airplanes."
3—A series of simulated forced landings, emphasizing that "one should always be prepared to cope with engine failure."
4—A normal flight to a nearby airport and return, calling the student's attention to the ease with which the trip was made in comparison with other modes of transportation.

4161. Should an instructor be concerned about an apt student who makes very few mistakes?

1—Yes; the student will lose confidence in the instructor unless the instructor invents deficiencies in the student's performance.
2—No; this is an indication that the student will perform flawlessly throughout the training program.
3—No; the correction of such a student's mistakes is unimportant and unnecessary.
4—Yes; faulty performance may soon appear due to student overconfidence.

4162. Faulty performance due to student overconfidence should be corrected by

1—requiring the student to perform unpleasant tasks.
2—withholding the evaluation of the student's progress.
3—praising the student only when it is deserved.
4—raising the standard of performance for each lesson.

4163. If a student's progress is slow due to discouragement and a lack of confidence, the instructor should

1—accept the slow rate of progress and accept a substandard performance.
2—provide unlimited help and encouragement.
3—have the student practice elements of the task involved until confidence and ability are gained.
4—discontinue directing the student's attention to the unacceptable performance.

4164. When a student correctly understands the situation and knows the correct procedure for the task, but fails to act at the proper time, the student most probably

1—lacks self–confidence.
2—feels that the instructor is making unreasonable demands for performance and progress.
3—is handicapped by indifference or lack of interest.
4—will be unable to cope with the demands of flying.

4165. What should an instructor do if a student is suspected of not fully understanding the principles involved in a task, even though the student can correctly perform the task?

1—Emphasize that mastery of the task is more important than complete understanding.
2—Require the student to apply the same elements to the performance of other tasks.
3—Introduce a more complicated task and ask the student to explain the elements involved.
4—Construct a specific and factual oral or written quiz which requires a simple "yes" or "no" answer.

4166. When under stress, normal individuals usually react

1—by responding rapidly and exactly, often automatically, within the limits of their experience and training.
2—inappropriately such as extreme over–cooperation, painstaking self–control, and inappropriate laughing or singing.
3—with very rapid changes in emotions, severe anger at the instructor, or others.
4—with marked changes in mood on different lessons such as excellent morale followed by deep depression.

4167. The instructor can counteract anxiety in a student by

1—treating the student's fears as a normal reaction.
2—ignoring the student's fears.
3—continuously citing the unhappy consequences of faulty performance.
4—discontinuing instruction in the tasks that cause anxiety.

4168. Which of the following would most likely be an indication that a student is reacting abnormally to stress?

1—Slow changes in emotions.
2—Automatic response to a given situation.
3—Rapid thinking and reaction.
4—Inappropriate laughter or singing.

4169. Which of the following would most likely be an indication that a student is reacting abnormally to stress?

1—Hesitancy to act.
2—Slow progress.
3—Extreme over–cooperation.
4—Automatic response to a given situation.

4170. The basic demonstration/performance method of instruction consists of several steps. In proper order, they are

1—instructor tells – – instructor does; student tells – – instructor does; student does – – instructor evaluates.
2—instructor tells – – student does; student tells – – student does; student does – – instructor evaluates.
3—instructor tells – – instructor does; student tells – – instructor does; student tells – – student does; student does – – instructor evaluates.
4—instructor does – – instructor tells; student does – – instructor tells; student does – – student tells; student does – – instructor evaluates.

4171. The objective of integrated flight instruction is to

1—help the student develop habit patterns for observance of and reliance on flight instruments.
2—prepare the student for future instrument flying training.
3—prepare the student for emergency IFR situations.
4—correlate the ground and flight training curriculums.

4172. The primary objective of integrated flight instruction is the

1—formation of firm habit patterns for observing and relying on flight instruments.
2—development of ability to fly in instrument weather conditions.
3—improvement in proficiency for instrument rated pilots.
4—building of confidence in coping with marginal weather.

4173. During integrated flight instruction, an instructor should

1—always introduce the visual reference before the student attempts to perform a maneuver by instrument reference.
2—be vigilant for other air traffic while the student is operating by instrument references.
3—dedicate the major portion of each training period to instrument flight instructions.
4—always introduce the instrument reference before the student attempts to perform a maneuver by visual references.

4174. Which of the following is an acceptable procedure when using the integrated method of flight instruction?

1—Prior to the first flight, clearly explain the differences in the manipulation of flight controls for maintaining aircraft control when under simulated instrument conditions and when using references outside the aircraft.
2—Include in the student's first instruction on the function of flight controls the instrument indication to be expected, as well as the outside references used in attitude control.
3—Use alternate and distinct periods devoted entirely to instrument flight or to visual flight.
4—Restrict to pre-solo instruction the integration of visual and instrument references.

4175. One of the surest ways to lose the student's confidence and attention is for the instructor to

1—create the impression of talking down to the student.
2—admit not knowing the answer to the student's question.
3—acknowledge that both the student and instructor are important to each other.
4—refer to a checklist before takeoff or to a lesson plan during ground training.

4176. Which of the following is the most accurate statement concerning student fatigue during pilot training?

1—Fatigue will be more pronounced when a number of tasks involving different elements and objectives are introduced.
2—Fatigue is the primary consideration in determining the length and frequency of instruction periods.
3—Fatigue is induced solely because of tenseness and can be minimized by a review of tasks already learned.
4—Fatigue is a factor which depends more on mental alertness than on physical condition.

4177. Which of the following would lead to lack of student confidence in the instructor?

1—Unplanned periods of instruction or poor preparation.
2—Too much help and encouragement given by the instructor to the slow student.
3—A situation in which quick or brisk instruction is given.
4—An examination given on the first day of class.

4178. What technique can the instructor use to delay the onset of fatigue during flight training?

1—Introducing a number of different maneuvers involving different elements and objectives.
2—Lengthening the instruction periods.
3—Increasing the complexity of maneuvers.
4—Increasing the frequency of instruction periods.

4179. To deal with the problem of student airsickness, the instructor should be aware that it is

1—confined to the emotionally unstable student and indicates a weakness that will exist throughout that person's career.
2—a motion sickness to which resistance or immunity can be developed if the flight is terminated as soon as incipient sickness is experienced.
3—a reaction to fear and apprehension that is only exhibited by the timid student.
4—caused by a lack of confidence on the student's part.

4180. Instruction that is keyed to the pace of a slow learner, but is applied to an apt student, will most likely result in

1—motivation.
2—impatience.
3—confusion.
4—a feeling of unfair evaluations.

4181. Students who grow impatient when learning the basic elements of a task are those who

1—should have the preliminary training presented one step at a time with clearly stated goals for each step.
2—are less easily discouraged than the unaggressive students.
3—possess superior motivation.
4—should not be held back by insisting that the immediate goal be reached before they progress to the next step in training.

4182. Which of the following is one of the ways in which anxiety or apprehension will affect a student?

1—Anxiety tends to increase mental acuity and perceptiveness, but interferes with muscular coordination.
2—Anxiety causes dispersal of the student's attention over such a wide range of matters as to interfere with normal reactions.
3—Anxiety will speed up the learning process for the student if properly controlled and directed by the instructor.
4—Anxiety may limit the student's ability to learn from perceptions.

4183. Which statement is true concerning extraneous blocks of instruction during a course of training?

1—They detract from the completion of the final objective.
2—They are usually necessary parts of the total objective.
3—They provide measurable objectives.
4—They assist in the attainment of the lesson's objective.

4184. Development and assembly of blocks of learning in their proper relationship will provide a means for

1—both the instructor and student to easily correct faulty habit patterns.
2—eliminating the need to master initial instruction in the simple elements of a task before more advanced operations can be introduced.
3—taking full advantage of both positive and negative transfer of learning.
4—allowing the student to master the segments of the overall pilot performance requirements individually and combining these with other related segments.

4185. In planning any instructional activity, the first consideration should be to

1—develop a sequence of training periods.
2—determine aptitudes of the students.
3—identify the blocks of learning which make up the overall objective.
4—determine the overall objectives and standards.

4186. In planning instructional activity, the second step is to

1—determine the personality and intelligence level of assigned students.
2—establish the overall objectives and standards.
3—identify the blocks of learning which constitute the necessary parts of the total objective.
4—develop lesson plans for each period or unit of instruction.

4187. When it is impossible to conduct a scheduled lesson, it is preferable for the instructor to

1—postpone all lessons until the scheduled lesson can be completed.
2—revise the lesson objective.
3—conduct a lesson that is not predicated completely on skills to be developed during the lesson which was postponed.
4—proceed to the next scheduled lesson, or if this is not practical, cancel the lesson.

4188. Which statement is true regarding course syllabi?

1—They should be used primarily by inexperienced instructors.
2—They should be used primarily when teaching students who have already received part of their training from another instructor.
3—They should be followed rigidly if maximum benefit is to be derived from their use.
4—They should be altered to suit the student's progress and the demands of special circumstances.

4189. Which statement is true regarding lesson plans?

1—Lesson plans may be either mental outlines or in written form.
2—The rigid use of prepared lesson plans for all students is most effective.
3—Lesson plans should not include reviews of earlier lessons.
4—Lesson plans help instructors keep a constant check on their own activity as well as that of their students.

4190. Which statement is true regarding lesson plans?

1—To be effective, lesson plans must be in written form.
2—Rigidly followed lesson plans for all students are most effective for instructional flights.
3—Lesson plans should not be directed toward the course objective; only to the lesson objective.
4—Lesson plans should not contain material or skills previously learned.

4191. With regard to the characteristics of a well-planned lesson, each lesson should contain

1—new material that is related to the lesson previously presented.
2—information that is independent of earlier lessons.
3—all the information needed to reach the objective of the training syllabus.
4—only one element of a simple principle, procedure, or skill.

4192. In developing a lesson plan for an in-flight lesson on ground reference maneuvers, which of these would correctly state the true objective of the lesson?

1—"To learn the principles of planning and following a pattern . . . ."
2—"To cover the principles of planning and following a pattern . . . ."
3—"To explain and demonstrate the principles of planning and following a pattern . . . ."
4—"To develop the student's skill in planning and following a pattern . . . ."

4193. Which statement is true about lesson plans?

1—An effective lesson plan may be only a mental outline.
2—The use of a rigidly prepared lesson plan should be used for an instructional flight.
3—The lesson should contain new facts, principles, procedures, or skills related to a previous lesson.
4—A good flight training lesson plan will eliminate the need for a review of earlier lessons.

4194. If lesson plans are constructed in a proper manner, they will provide an outline for

1—the teaching procedure to be used in a single instructional period.
2—proceeding from the unknown to the known.
3—each lesson of the course without regard to the student/instructor relationship.
4—blocks of learning that become progressively larger in scope.

4195. With regard to the use of a lesson plan for conducting a ground school period, which statement is true?

1—An approach which has been successful with one group is always successful with another.
2—A lesson should provide as much information related to the subject as possible.
3—A carefully thought-out lesson plan has little or no bearing on achieving teaching success.
4—If the lesson plan is not leading to the desired results, the instructor should change the approach.

4196. If an aircraft is involved in an accident which resulted in substantial damage to the aircraft, the nearest NTSB field office should be notified

1—immediately.
2—within 5 days.
3—within 7 days.
4—within 10 days.

4197. The NTSB Regulation requires an immediate notification as a result of which incident?

1—Any required flight crewmember being unable to perform flight duties because of illness.
2—Engine failure for any reason during flight.
3—Damage to the landing gear as a result of a hard landing.
4—Generator failure in flight which results in the loss of the electrical system.

4198. Notification to the NTSB is required when there has been any damage

1—caused by collision with another aircraft on the ground.
2—to an engine caused by engine failure in flight.
3—which adversely affects structural strength or flight characteristics.
4—which requires repairs to landing gear or flaps.

4199. The operator of an aircraft that has been involved in an accident is required to file an accident report within how many days?

1—3.
2—5.
3—7.
4—10.

4200. The operator of an aircraft that has been involved in an incident is required to submit a report to the nearest field office of the NTSB

1—within 3 days.
2—within 10 days.
3—within 7 days.
4—only if requested to do so.

4201. Airport traffic areas are in effect at all airports where

1—the airport is located within the lateral limits of controlled airspace.
2—a control tower is in operation.
3—an FSS is in operation.
4—a control zone is in effect.

4202. An airport traffic area extends upward to, but does not include,

1—2,000 ft. MSL.
2—2,000 ft. AGL.
3—3,000 ft. MSL.
4—3,000 ft. AGL.

4203. As used in aviation, flight visibility means

1—the average visibility in all directions as seen from the cockpit of an aircraft in flight.
2—the average slant-range distance that the pilot can see from the cockpit of an aircraft in flight to the ground.
3—the prevailing horizontal visibility near the Earth's surface as reported by the United States National Weather Service or an accredited observer.
4—the average forward horizontal distance from the cockpit of an aircraft in flight, at which prominent objects unlighted by day and lighted by night, may be seen.

4204. If the operational category of an airplane is listed as normal, it would mean that this airplane could be operated in which of the following maneuvers?

1—All types of acrobatics.
2—Any maneuver requiring an abrupt change in attitude.
3—Limited acrobatics, including spins.
4—Any maneuver except acrobatics or spins.

4205. If the operational category of an airplane is listed as "utility," it would mean that this airplane could be operated in which of the following maneuvers?

1—Any maneuver except acrobatics or spins.
2—All types of acrobatics.
3—Any maneuver that requires an abrupt change in attitude.
4—Limited acrobatics, including spins (if approved for the particular type of airplane).

4206. What document(s) must you have in your personal possession while operating as pilot in command of an aircraft?

1—A certificate showing accomplishment of a current flight review.
2—A certificate showing accomplishment of a checkout in the aircraft and a current flight review.
3—A pilot logbook with endorsements showing accomplishment of a current flight review and recency of experience.
4—An appropriate pilot certificate and a current medical certificate.

4207. Examples of the term category as used with respect to certification, privileges, and limitations of airmen include

1—free balloon, single–engine, multiengine, land, and water.
2—lighter–than–air, airplane, rotorcraft, and glider.
3—normal, utility, restricted, and transport.
4—AX–6, Cessna 150, DC–9, and Lear Jet.

4208. Which of the following would be considered aircraft class ratings?

1—Single–engine land, multiengine land, single–engine sea, and multiengine sea.
2—Standard, restricted, experimental, and limited.
3—Transport, normal, utility, and acrobatic.
4—Airplane, rotorcraft, glider, and lighter–than–air.

4209. A third–class medical certificate was issued on May 3, this year. To exercise the privileges of a private pilot certificate, the medical certificate will be valid through

1—May 31, 1 yr. later.
2—May 31, 2 yr. later.
3—May 3, 1 yr. later.
4—May 3, 2 yr. later.

4210. If a second–class medical certificate was issued to a commercial pilot 13 mo. ago, during the next 11 mo., this pilot may

1—act as pilot in command and carry passengers or property, but not for compensation or hire.
2—act as pilot in command for compensation or hire and carry passengers or property for compensation or hire.
3—not act as pilot in command nor carry passengers or property.
4—act as pilot in command for compensation or hire, but may not carry passengers or property for compensation or hire.

4211. According to FAR's, a second–class medical certificate issued January 18 of this year will

1—expire January 18 of the next year.
2—expire for commercial pilot privileges January 31, 2 yr. later.
3—be issued without a specific expiration date if there are no limitations that would affect the safe operation of an aircraft.
4—expire January 31, of the next year for commercial pilot privileges, but may be used for private pilot privileges until January 31, 2 yr. later.

4212. To act as pilot in command of an airplane that has more than 200 hp, a person is required to do which of the following, if no pilot–in–command time in a high–performance airplane was logged prior to November 1, 1973?

1—Make three solo takeoffs and landings in such an airplane.
2—Receive flight instruction in an airplane that has more than 200 hp.
3—Pass a flight test in such an airplane.
4—Hold a 200–hp class rating.

4213. Unless otherwise authorized, a pilot in command is required to possess a type rating for that aircraft when operating

1—an airplane with a gross weight in excess of 6,000 lb.
2—a multiengine airplane with a gross weight in excess of 6,000 lb.
3—an airplane with a gross weight in excess of 12,500 lb.
4—any aircraft that requires more than one pilot.

4214. To act as pilot in command of an airplane that is equipped with a retractable landing gear, a person is required to do which of the following if no pilot–in–command time in such an airplane was logged prior to November 1, 1973?

1—Receive flight instruction in such an airplane and obtain a logbook endorsement of competency.
2—Hold a retractable–gear airplane class rating.
3—Make at least three solo takeoffs and landings in such an airplane.
4—Pass an FAA flight test in such an airplane.

4215. What flight time must be shown, in a reliable record, by a pilot exercising the privileges of a commercial certificate?

1—All additional flight time.
2—All flight time flown with passengers aboard the aircraft.
3—Only the flight time necessary to meet the recent experience requirements.
4—Only the additional flight instruction time received.

4216. What flight time may a pilot log as second in command?

1—All flight time while acting as second in command regardless of aircraft crew requirements.
2—All flight time while acting as second in command in aircraft requiring more than one pilot.
3—Only that flight time during which the second in command is the sole manipulator of the controls.
4—One-half of the total flight time while serving as second in command on aircraft requiring more than one pilot.

4217. To serve as second in command of large airplanes, a person must hold at least

1—a private pilot certificate with appropriate category and class ratings.
2—a commercial pilot certificate with the appropriate category, class, and type ratings.
3—a commercial pilot certificate, an appropriate instrument rating, and be type certificated in the airplane.
4—an airline transport pilot certificate with the appropriate category and type ratings.

4218. If recency of experience requirements for night flight are not met and official sunset is 1830, the latest time passengers may be carried is

1—1730.
2—1830.
3—1900.
4—1930.

4219. What recent flight experience must be met before a commercial airplane pilot may fly solo in an airplane?

1—Three takeoffs and three landings within the preceding 90 days in an airplane.
2—Three takeoffs and three landings within the preceding 90 days in any fixed-wing aircraft.
3—Satisfactorily accomplished a flight review in any aircraft for which rated, within the preceding 24 mo.
4—Satisfactorily accomplished a flight review within the preceding 24 mo., but this review must be in an airplane.

4220. To meet the recent flight experience requirements for acting as pilot in command carrying passengers at night, a pilot must have made, within the preceding 90 days and at night, at least

1—three takeoffs and three landings to a full stop in the same category and class of aircraft to be used.
2—three touch-and-go landings in the same category and class of aircraft to be used.
3—three takeoffs and three landings, either full stop or touch and go, but must be accompanied by a certificated flight instructor who meets the recent experience for night flight.
4—three takeoffs and three landings to a full stop in the same category but not necessarily in the same class of aircraft to be used.

4221. The takeoffs and landings required to meet recency of experience requirements for carrying passengers in a tailwheel airplane

1—may be touch and go in the same class airplane.
2—must be touch and go in any class airplane.
3—may be full stop in any class airplane.
4—must be full stop in the same class airplane.

4222. A person who has cheated or committed any unauthorized act during a written examination may not take any written examination within

1—90 days.
2—6 mo.
3—1 yr.
4—2 yr.

4223. The holder of a pilot certificate who fails to notify the FAA Airmen Certification Branch of a change of permanent mailing address may exercise the privileges of that pilot certificate for how many days after the date of change?

1—60 days.
2—30 days.
3—14 days.
4—7 days.

4224. To act as pilot in command of an airplane in a passenger-carrying airlift sponsored by a charitable organization, a private pilot is required to have

1—special authorization from FAA.
2—logged at least 200 hr. of flight time.
3—at least 100 hr. of pilot-in-command time.
4—an instrument pilot rating, if the flights extend beyond a 25-mile radius.

4225. What limitation is imposed on a newly certificated commercial airplane pilot if that person does not hold an instrument pilot rating?

1—That person is limited to private pilot privileges.
2—The carrying of passengers or property for hire on cross-country flights at night is limited to a radius of 50 NM.
3—The carrying of passengers for hire on cross-country flights is limited to 50 NM and the carrying of passengers for hire at night is prohibited.
4—The carrying of passengers for hire on cross-country flights is limited to 50 NM for night flights, but not limited for day flights.

4226. Unless otherwise specified, Federal airways extend from

1—the surface upward to 18,000 ft. MSL and are 4 NM wide.
2—1,200 ft. above the surface upward to 14,500 ft. MSL and are 16 NM wide.
3—700 ft. above the surface upward to the continental control area and are 10 NM wide.
4—1,200 ft. above the surface upward to 18,000 ft. MSL and are 8 NM wide.

4227. Control areas within the contiguous U.S. extend upward from either 700 ft. or 1,200 ft. above the surface to but not including

1—3,000 ft. MSL.
2—18,000 ft. MSL.
3—24,000 ft. MSL.
4—the base of the continental control area.

4228. With certain exceptions, the continental control area extends upward from

1—the surface.
2—10,000 ft. MSL.
3—14,500 ft. MSL.
4—18,000 ft. MSL.

4229. One of the major differences between control zones and control areas is that all control zones

1—begin at the surface, while all control areas begin at an altitude of 700 ft. or higher above the surface.
2—always begin at 700 ft. AGL while control areas always begin at 1,200 ft. above the surface.
3—are located around tower-controlled airports only.
4—have higher basic VFR weather minimums than control areas.

4230. Which statement is true regarding control zones?

1—They are not depicted on Sectional Aeronautical Charts.
2—Designated control zones are located only at those airports which have a control tower in operation.
3—Unless they underlie the continental control area, control zones have no upper limit.
4—They extend upward from 700 ft. AGL and terminate at the base of the continental control area.

4231. Within the contiguous U.S., the vertical limit of control zones extends from the surface upward to

1—but not including 3,000 ft. AGL.
2—but not including 10,000 ft. MSL.
3—the base of the continental control area.
4—infinity.

4232. If an in-flight emergency requires immediate action, a pilot in command may

1—deviate from FAR's to the extent required to meet the emergency, but must submit a written report to the Administrator within 24 hr.
2—not deviate from FAR's unless prior to the deviation approval is granted by the Administrator.
3—deviate from FAR's to the extent required to meet that emergency.
4—not deviate from FAR's unless permission is obtained from air traffic control.

4233. In addition to other preflight action for a VFR cross-country flight, regulations specifically require the pilot in command to

1—check the accuracy of the omninavigational equipment if the flight is to be made on airways.
2—determine runway lengths at the airports of intended use.
3—check each fuel tank visually to ensure that it is always filled to capacity.
4—file a flight plan for the proposed flight.

4234. Which preflight action is required for every flight?

1—Check weather reports and forecasts.
2—Determine runway length at airports of intended use.
3—Determine alternatives if the flight cannot be completed.
4—Check for any known traffic delays.

4235. The preflight action required by regulations relative to alternatives available if the planned flight cannot be completed, is applicable to

1—IFR flights only.
2—any flight conducted for hire or compensation.
3—any flight not in the vicinity of an airport.
4—all IFR and night VFR flights.

4236. Which statement is true regarding the fastening of seatbelts?

1—All persons on board must have their seatbelts fastened during the entire flight.
2—Seatbelts must be fastened about passengers during takeoff and landing only, while required flight crewmembers' seatbelts must be fastened during the entire flight.
3—Seatbelts must be fastened about passengers and required crewmembers during takeoff and landing only.
4—Seatbelts must be fastened about passengers during takeoff and landing only, while each required crewmember's seatbelt must be fastened at all times while occupying an assigned station.

4237. Under what condition, if any, may a pilot allow a person who is obviously under the influence of intoxicating liquors or drugs to be carried aboard an aircraft?

1—Under no condition.
2—Only if the person is a medical patient under proper care or in an emergency.
3—Only if the person does not have access to the cockpit or pilot's compartment.
4—Only if a second pilot is aboard.

4238. A person may not act as a crewmember of a civil aircraft if alcoholic beverages have been consumed by that person within the preceding

1—8 hr.
2—12 hr.
3—24 hr.
4—48 hr.

4239. When must each occupant of an aircraft wear an approved parachute?

1—When an aircraft is being tested after major repair.
2—When flying over water beyond gliding distance to the shore.
3—When a door is removed from the aircraft to facilitate parachute jumpers.
4—When an intentional bank that exceeds 60° is to be made.

4240. A chair-type (canopy in back) parachute (made entirely of synthetic material) is carried in an aircraft and is available for emergency use. Regulations require that this parachute must have been packed by an appropriately rated parachute rigger within the preceding

1—60 days.
2—90 days.
3—120 days.
4—180 days.

4241. Which of the following is required to operate an aircraft towing an advertising banner?

1—Approval from ATC to operate in a control area.
2—A record of training in towing for the pilot in command.
3—A safety link at each end of the towline which has a breaking strength not less than 80 percent of the aircraft's gross weight.
4—A certificate of waiver issued by the Administrator.

4242. Portable electronic devices which may cause interference with the navigation or communication system may not be operated on aircraft being flown

1—in commercial operations.
2—at altitudes above 14,500 ft. MSL.
3—within the U.S.
4—along Federal airways.

4243. What is the fuel requirement for flight under VFR at night?

1—Full fuel tanks.
2—Enough to complete the flight at normal cruising flight with adverse wind conditions.
3—Enough to fly to the first point of intended landing and to fly after that for 30 min. at normal cruising speed.
4—Enough to fly to the first point of intended landing and to fly after that for 45 min. at normal cruising speed.

4244. What is the fuel requirement for flight under VFR during daylight hours?

1—Full fuel tanks.
2—Enough to complete the flight at normal cruising flight with adverse wind conditions.
3—Enough to fly to the first point of intended landing and to fly after that for 30 min. at normal cruising speed.
4—Enough to fly to the first point of intended landing and to fly after that for 45 min. at normal cruising speed.

4245. How long before the proposed operation should a request be submitted to the controlling ATC facility to operate in a Group I TCA without the required 4096 code transponder?

1—1 hr.
2—4 hr.
3—8 hr.
4—24 hr.

4246. A coded transponder equipped with altitude reporting equipment is required for all controlled airspace

1—except control zones.
2—above 12,500 ft. MSL (excluding airspace at or below 2,500 ft. AGL).
3—above 18,000 ft. MSL (excluding airspace at or below 1,500 ft. AGL).
4—below 14,500 ft. MSL.

4247. Regarding certificates and documents, no person may operate an aircraft unless it has within it an

1—airworthiness certificate, aircraft and engine logbooks, and owner's handbook.
2—airworthiness certificate and owner's handbook.
3—airworthiness certificate, registration certificate, and operating limitations.
4—airworthiness certificate, and aircraft and engine logbooks.

4248. An aircraft's operating limitations may be found

1—on the airworthiness certificate.
2—in the airplane flight manual, approved manual material, markings, and placards, or any combination thereof.
3—only in the FAA approved airplane flight manual.
4—only in the owner's handbook published by the aircraft manufacturer.

4249. Unless each occupant is provided with supplemental oxygen, no person may operate a civil aircraft of U.S. registry above a cabin pressure altitude of

1—15,000 ft. MSL.
2—14,000 ft. MSL.
3—12,500 ft. MSL.
4—10,000 ft. MSL.

4250. If a pressurized airplane is not equipped with a quick-donning type oxygen mask, one pilot at the controls must wear and use an oxygen mask when operating above which flight level?

1—FL180.
2—FL250.
3—FL300.
4—FL350.

4251. At which of these cabin pressure altitudes may a pilot operate an aircraft in excess of 30 min. without supplemental oxygen?

1—15,500 ft. MSL.
2—15,000 ft. MSL.
3—14,500 ft. MSL.
4—12,500 ft. MSL.

4252. If an unpressurized aircraft is operated above 12,500 ft. MSL, but not more than 14,000 ft. MSL, for a period of 2 hr. 20 min., how long during that time is the minimum flightcrew required to use supplemental oxygen?

1—2 hr. 20 min.
2—1 hr. 20 min.
3—1 hr. 50 min.
4—Supplemental oxygen is not required.

4253. Which is required equipment for powered aircraft during VFR night flights?

1—Gyroscopic bank and pitch indicator.
2—Gyroscopic direction indicator.
3—Appropriate radio navigational equipment.
4—Anticollision light system.

4254. When conducting VFR operations at night for hire, the aircraft must be equipped with at least

1—a sensitive altimeter.
2—one landing light.
3—an attitude indicator.
4—a flashing strobe on the vertical fin.

4255. Which of the following aircraft requires an altitude alerting system or device when being operated?

1—All turbojet-powered airplanes.
2—All airplanes except those used for training.
3—All airplanes with a gross weight of more than 12,500 lb.
4—All transport-type airplanes.

4256. When are emergency locator transmitter batteries required to be replaced or recharged?

1—After 1 cumulative hour of use.
2—After 30 cumulative minutes of use.
3—After 100 cumulative hours of use.
4—Every 6 months.

4257. What is the maximum distance from an airport that an airplane engaged in training operations may be operated without an emergency locator transmitter?

1—10 mi.
2—25 mi.
3—50 mi.
4—75 mi.

4258. The expiration date for batteries used in emergency locator transmitters must be legibly marked, on the

1—airworthiness certificate.
2—outside of the transmitter.
3—radio station license.
4—instrument panel.

4259. May an airplane be operated in formation flight while passengers are carried for hire?

1—No, this is not authorized.
2—Yes, if the passengers approve.
3—Yes, provided arrangements have been made with the other pilot(s).
4—Yes, if operating outside controlled airspace.

4260. If on a night flight, the pilot of airplane "A" observes only the green wingtip light of airplane "B", and the airplanes are converging, which airplane has the right-of-way?

1—Airplane "B"; it is to the right of airplane "A".
2—Airplane "A"; it is to the right of airplane "B".
3—Airplane "B"; it is to the left of airplane "A".
4—Airplane "A"; it is to the left of airplane "B".

4261. When two or more airplanes are approaching an airport for the purpose of landing, the right-of-way belongs to the airplane

1—that has the other to its right.
2—that is the least maneuverable.
3—that is either ahead of or to the other's right regardless of altitude.
4—at the lower altitude, but it shall not take advantage of this rule to cut in front of or to overtake another.

4262. What action should be taken if a glider and an airplane approach each other at the same altitude and on a head-on collision course?

1—The airplane should give way because the glider has the right-of-way.
2—The airplane should give way because it is more maneuverable.
3—Both should give way to the right.
4—The airplane should climb and the glider should descend so as to pass each other by at least 500 ft.

4263. The maximum indicated airspeed permitted when operating a reciprocating engine aircraft within an airport traffic area located outside a terminal control area is

1—156 kts.
2—180 kts.
3—200 kts.
4—230 kts.

4264. When flying beneath the lateral limits of a terminal control area, the maximum speed authorized is

1—250 kts.
2—200 kts.
3—180 kts.
4—156 kts.

4265. Unless otherwise authorized, what is the maximum speed at which a turbine-powered aircraft should be flown within an airport traffic area which is not in a terminal control area?

1—156 kts.
2—200 kts.
3—230 kts.
4—288 kts.

4266. Unless otherwise authorized or required by air traffic control, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 ft. MSL?

1—156 kts.
2—180 kts.
3—200 kts.
4—250 kts.

4267. What is the minimum altitude required for acrobatic flight?

1—3,000 ft. AGL.
2—2,000 ft. MSL.
3—1,500 ft. AGL.
4—1,000 ft. MSL.

4268. What is the minimum flight visibility required for acrobatic flight?

1—5 mi.
2—3 mi.
3—2 mi.
4—1 mi.

4269. According to regulations, which statement is true regarding acrobatic flight or the use of parachutes?

1—Parachutes are always required for all occupants of an aircraft when spins are practiced.
2—For acrobatic flight, the visibility must be at least 5 mi. and the ceiling must be 3,000 ft. or more.
3—Parachutes are not required when a private pilot carrying a passenger performs a power-on stall in a noseup attitude of 40° relative to the horizon.
4—An intentional maneuver, not necessary for normal flight involving an abrupt change in the aircraft's attitude, is considered acrobatic flight.

4270. When an aircraft is being operated at night, it must display lighted position lights during the period from

1—1 hr. before sunset to 1 hr. after sunrise.
2—30 min. after sunset to 30 min. after sunrise.
3—30 min. before sunset to 30 min. after sunrise.
4—sunset to sunrise.

4271. What action, if any, is appropriate if you deviate from an air traffic control instruction during an emergency and are given priority?

1—Take no special action since you are pilot in command.
2—If requested, file a detailed report within 48 hr. to the chief of the air traffic control facility.
3—File a report to the FAA Administrator within 48 hr.
4—File a report to the chief of that air traffic control facility within 24 hr.

4272. While in flight, a steady red light directed at you from the control tower means

1—give way to other aircraft; continue circling.
2—return for landing; expect steady green light at the appropriate time.
3—continue flight; exercise extreme caution.
4—continue flight; airport unsafe, do not land.

4273. While in flight, an alternating red and green light directed at you from the control tower means

1—give way to other aircraft; continue circling.
2—exercise extreme caution.
3—airport unsafe; do not land.
4—return for landing; expect steady green light at proper time.

4274. If a flashing red light from the tower is received while holding on a runway for takeoff, the pilot should

1—return to the starting point.
2—taxi clear of the runway.
3—hold the position.
4—take off immediately.

4275. You receive a flashing white light from a control tower during the run-up prior to takeoff; what action should you take?

1—Proceed, exercising extreme caution.
2—Taxi clear of the runway in use.
3—Return to your starting point on the airport.
4—None; since this light signal is applicable only to aircraft in flight.

4276. To operate an aircraft over any congested area, a pilot should maintain an altitude of at least

1—500 ft. above the highest obstacle within a horizontal radius of 500 ft.
2—500 ft. above the highest obstacle within a horizontal radius of 1,000 ft.
3—1,000 ft. above the highest obstacle within a horizontal radius of 2,000 ft.
4—2,000 ft. above the highest obstacle within a horizontal radius of 1,000 ft.

4277. The minimum altitude at which an airplane may be operated over a structure which is located in a sparsely populated area is

1—1,000 ft. above the ground.
2—1,000 ft. above the structure.
3—500 ft. above the ground.
4—500 ft. above the structure.

4278. Except when necessary for takeoff or landing, what is the minimum safe altitude for a pilot to operate an aircraft anywhere?

1—An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.
2—An altitude of 500 ft. above the surface and no closer than 500 ft. to any person, vessel, vehicle, or structure.
3—An altitude of 500 ft. above the highest obstacle within a horizontal radius of 1,000 ft.
4—An altitude of 1,000 ft. above the highest obstacle within a horizontal radius of 2,000 ft.

4279. Prior to takeoff, the altimeter should be set to

1—the current local altimeter setting, if available, or the departure airport elevation.
2—the corrected density altitude of the departure airport.
3—the corrected pressure altitude for the departure airport.
4—29.92" Hg.

4280. What type airspeed at the planned cruise altitude should be entered on a flight plan?

1—Estimated groundspeed.
2—Indicated airspeed.
3—True airspeed.
4—Calibrated airspeed.

4281. A turbine powered or large airplane is required to enter an airport traffic area at an altitude of at least

1—1,000 ft. AGL.
2—1,500 ft. AGL.
3—2,000 ft. AGL.
4—3,000 ft. AGL.

4282. An airport without a control tower lies within the airport traffic area of an airport that has an operating tower. According to regulations, air traffic control authorization is required to land at

1—the tower-controlled airport only, as well as to fly through the area.
2—both airports, as well as to fly through the area.
3—both airports, but not required to fly through the area.
4—the tower-controlled airport only, but not required to fly through the area.

4283. What is the correct departure procedure at a noncontrolled airport?

1—Departure in any direction consistent with safety, after crossing the airport boundary.
2—The FAA approved departure procedure for that airport.
3—Depart in the same manner as at other airports.
4—Make all left turns, except a 45° right turn on the first crosswind leg.

4284. Which statement is true regarding VFR operations in terminal control areas?

1—Flight under visual flight rules is not authorized within Group I terminal control areas.
2—Solo student pilots are not authorized to take off or land at airports that are located within Group I terminal control areas.
3—When operating within Group II terminal control areas, VOR receivers are not required.
4—Flight plans are required to be filed prior to operating within Group II terminal control areas.

4285. Which statement is true concerning the requirements for flight within a Group I terminal control area?

1—Distance measuring equipment is required.
2—At least a commercial pilot certificate is required.
3—Automatic altitude alerting system is required.
4—A 4096 radar beacon transponder and automatic altitude reporting equipment are required.

4286. Which equipment is required when operating an airplane within a Group II terminal control area?

1—A 4096 code transponder.
2—A 4096 code transponder with Mode C capability.
3—A VOR receiver with distance measuring equipment.
4—An automatic direction finder.

4287. In which type of airspace are VFR flights prohibited?

1—Terminal control area.
2—Continental control area.
3—Control zone.
4—Positive control area.

4288. During VFR operations outside controlled airspace at altitudes of less than 1,200 ft. AGL, what is the minimum distance from clouds requirement?

1—Remain clear of clouds.
2—500 ft. above or 1,000 ft. below and 2,000 ft. horizontal.
3—500 ft. above or 500 ft. below and 1,000 ft. horizontal.
4—1,000 ft. above or 1,000 ft. below and 1,500 ft. horizontal.

4289. During operations within controlled airspace at altitudes of more than 1,200 ft. AGL, but less than 10,000 ft. MSL, the minimum horizontal distance from clouds requirement for VFR flight is

1—500 ft.
2—1,000 ft.
3—1,500 ft.
4—2,000 ft.

4290. While in uncontrolled airspace in VFR conditions, what distance from clouds should be maintained when flying more than 1,200 ft. AGL, and at or above 10,000 ft. MSL?

1—500 ft. below; 1,000 ft. above; 1 SM horizontal.
2—1,000 ft. below; 500 ft. above; 2,000 ft. horizontal.
3—1,000 ft. below; 1,000 ft. above; 1 SM horizontal.
4—500 ft. below; 1,000 ft. above; 2,000 ft. horizontal.

4291. While in controlled airspace in VFR conditions, what in-flight visibility is required when flying more than 1,200 ft. AGL and at or above 10,000 ft. MSL?

1—5 SM.
2—3 SM.
3—2 SM.
4—1 SM.

4292. When operating an airplane within a control zone under special visual flight rules, the flight visibility is required to be at least

1—1 SM.
2—2 SM.
3—3 SM.
4—5 SM.

4293. No person may operate an airplane within a control zone at night under special VFR unless

1—the flight can be conducted 500 ft. below the clouds.
2—an instructor is aboard.
3—the airplane is equipped for instrument flight.
4—the flight visibility is at least 3 mi.

4294. Regulations stipulate that at an airport located within a control zone and at which ground visibility is not reported, takeoffs and landings of airplanes under special VFR are

1—not authorized.
2—authorized if the flight visibility is at least 1 mi.
3—authorized only if another airport in that control zone reports a ground visibility of 1 mi.
4—not restricted by visibility requirements.

4295. When operating under VFR at more than 3,000 ft. AGL, cruising altitudes to be maintained are based upon the

1—magnetic course being flown.
2—true course being flown.
3—magnetic heading being flown.
4—true heading being flown.

4296. Which of the following courses and altitudes are appropriate for VFR aircraft operating more than 3,000 ft. AGL, but below 18,000 ft. MSL?

1—Magnetic course 180° – 359° inclusive, even thousands plus 500 ft.
2—True course 0° – 179° inclusive, odd thousands plus 500 ft.
3—True course 180° – 359° inclusive, odd thousands plus 500 ft.
4—Magnetic course 0° – 179° inclusive, even thousands plus 500 ft.

4297. Completion of an annual inspection and the return of an aircraft to service should always be indicated by

1—the relicensing date on the registration certificate.
2—an appropriate notation in the aircraft maintenance records.
3—the results of the inspection described on a repair and alteration form.
4—the issuance date of the airworthiness certificate.

4298. If an aircraft's operation in flight was substantially affected by an alteration or repair, the aircraft documents must show that it was test flown and approved for return to service by an appropriately rated pilot prior to being operated

1—away from the vicinity of the airport.
2—with passengers aboard.
3—for compensation or hire.
4—by any private pilot.

4299. An aircraft operated for hire has a 100-hour inspection performed after 90 hours in service. The next 100-hour inspection would be due after

1—10 hours' time in service.
2—90 hours' time in service.
3—100 hours' time in service.
4—110 hours' time in service.

4300. An aircraft's last annual inspection was performed on July 12, this year. The next annual inspection will be due no later than

1—July 31, next year.
2—July 13, next year.
3—100 flight hours following the last annual inspection.
4—12 calendar months after the date shown on the airworthiness certificate.

4301. Which of these operations is prohibited if the aircraft being used has not had a 100-hour inspection or annual inspection within the preceding 100 hours' time in service?

1—Carrying property for hire.
2—Conducting any commercial operation.
3—Carrying passengers, either for hire or not for hire.
4—Giving flight instructions for hire.

4302. What information from the aircraft maintenance records must be transferred with the aircraft at the time it is sold?

1—A description of all work performed on the aircraft.
2—The date of completion of all work which has been performed on the aircraft.
3—The current status of all applicable Airworthiness Directives.
4—The signature and certificate number of each person who has approved the aircraft for return to service after an inspection, alteration, or repair.

4303. If an ATC transponder installed in an aircraft has not been tested, inspected, and found to comply with regulations within a specified period, what is the limitation on its use?

1—It may be used anywhere except in terminal control areas.
2—It may be used when outside controlled airspace.
3—It may be used for VFR flight but not for IFR flight.
4—Its use is not permitted.

4304. When is a transponder in an airplane required to be tested, inspected, and found to comply with regulations?

1—Every 12 mo. if the airplane is operated for compensation or hire.
2—Within 24 mo. prior to use.
3—Every 36 mo. if the airplane is flown in noncommercial operations.
4—Each time the airplane receives an annual inspection.

4305. Unless that airplane is equipped with a life preserver or an approved flotation device for each occupant, no person may take off in a large or turbine powered multiengine aircraft for a flight over water of more than

1—10 NM from the nearest shoreline.
2—30 NM from the nearest shoreline.
3—40 NM from the nearest shoreline.
4—50 NM from the nearest shoreline.

4306. The segmented circle shown in Figure 1 indicates that the airport traffic is

1—left-hand for Rwy 17 and right-hand for Rwy 35.
2—right-hand for Rwy 9 and left-hand for Rwy 27.
3—right-hand for Rwy 35 and right-hand for Rwy 9.
4—left-hand for Rwy 35 and right-hand for Rwy 17.

4307. Which runway and traffic pattern should be used as indicated by the wind cone in the segmented circle depicted in Figure 1?

1—Right-hand traffic on Rwy 35.
2—Right-hand traffic on Rwy 17.
3—Left-hand traffic on Rwy 35 or right-hand traffic on Rwy 26.
4—Left-hand traffic on Rwy 26 or Rwy 35.

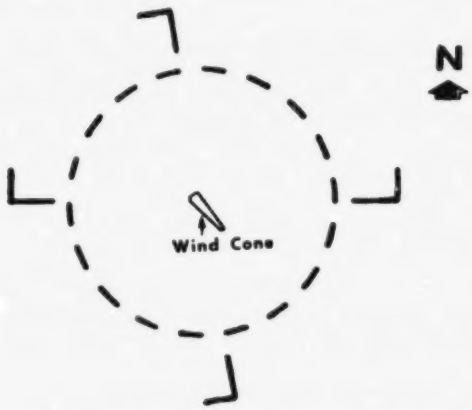


Figure 1

4308. A military airfield can be identified by

1—a flashing red light.
2—a white and red rotating beacon.
3—white flashing sequence lights (strobes).
4—a green and dual-peaked white rotating beacon.

4309. During the daylight hours, the operation of a rotating beacon at an airport located within a control zone means

1—right-hand traffic is in use at the airport.
2—the control tower is not in operation.
3—weather conditions are below basic VFR weather minimums.
4—parachute jumping is in progress in the airport traffic area.

4310. The visual glide slope of a 2-bar VASI provides safe obstruction clearance within plus or minus 10° of the extended runway centerline and to a distance of how many miles from the runway threshold?

1—4 NM.
2—6 NM.
3—8 NM.
4—10 NM.

4311. Which of the following indications would a pilot see while approaching to land on a runway served by a 2-bar VASI?

1—If below the glide slope, the near bars will be red and the far bars white.
2—If on the glide slope, the near bars will appear red and the far bars will appear white.
3—If departing to the high side of the glide slope, the far bars will change from red to pink to white.
4—If on the glidepath, both near bars and far bars will appear white.

4312. When on the glide slope of a standard 2-bar VASI, the far lights should be

1—red and the near lights should be white.
2—pink and the near lights should be white.
3—pink and the near lights should be pink.
4—white and the near lights should be red.

4313. An on glide slope indication from a tri-color VASI is

1—a white light signal.
2—a green light signal.
3—an amber light signal.
4—a pink light signal.

4314. An above glide slope indication from a tri-color VASI is

1—a white light signal.
2—a green light signal.
3—an amber light signal.
4—a pink light signal.

4315. A series of red lights in the runway centerline lighting indicates that

1—1,000 ft. of runway remain.
2—3,000 ft. of runway remain.
3—one-half of the runway remains.
4—there are no taxiway turnoffs until the end of the runway.

4316. The numbers 8 and 26 on the approach ends of the runway indicate that the runway is orientated approximately

1—080° and 260° magnetic.
2—008° and 026° true.
3—080° and 260° true.
4—008° and 026° magnetic.

4317. What is the relationship between the runway numbers and the wind direction given by control towers? Runway numbers are

1—true direction while wind is given in magnetic direction.
2—true direction and wind is given in true direction.
3—magnetic direction while wind is given in true direction.
4—magnetic direction and wind is given in magnetic direction.

4318. What does a series of arrows painted on the approach end of a runway signify?

1—That runway is a precision instrument approach runway.
2—That portion of the runway is not suitable for landing.
3—All landings and takeoffs on that runway must be made in the direction of the arrows.
4—That portion of the runway is the designated touchdown zone.

4319. If a landing were to be made on Rwy 12 shown in Figure 2, which statement would be true concerning runway markings?

1—Area "E" contains an arresting device used by military aircraft.
2—All aircraft must terminate their landing roll prior to reaching the intersection of Rwys 12-30 and 17-35.
3—Point "B" is the displaced threshold of Rwy 12 and indicates the beginning portion of the runway usable for landing.
4—Area "A" should be used for landings in light airplanes only.

4320. What is the difference between area "A" and area "E" on the airport depicted in Figure 2?

1—"A" may be used for taxi and takeoff; "E" may only be used as an overrun.
2—"A" may be used for all operations except heavy aircraft landings; "E" may only be used as an overrun.
3—"A" may only be used for taxi; "E" may be used for all operations except landings.
4—"A" may only be used for an overrun; "E" may only be used for taxi and takeoff.

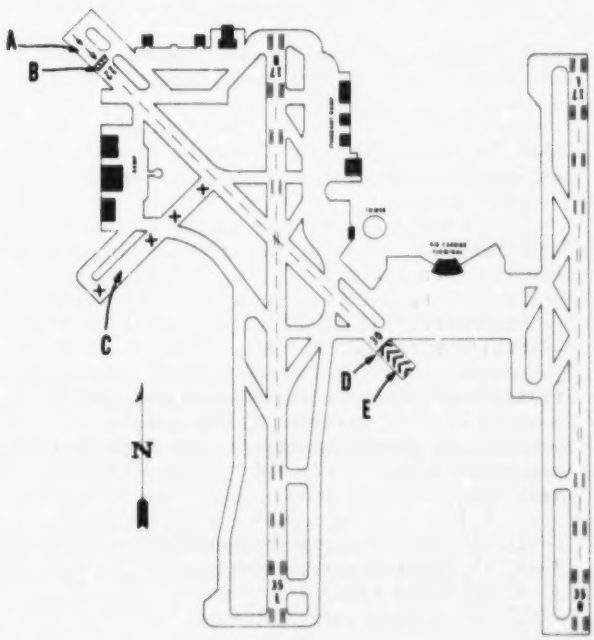


Figure 2

4321. Flight through a restricted area should not be accomplished unless the pilot has

1—filed a VFR flight plan.
2—received prior permission from the commanding officer of the nearest military base.
3—an airplane that is transponder equipped.
4—received prior authorization from the controlling agency.

4322. Airspace established as warning areas are located

1—in international airspace.
2—in the immediate vicinity of military bases.
3—where hazardous terrain exists.
4—along military low-altitude training routes.

4323. What hazards to aircraft may exist in warning areas and where are the warning areas located?

1—Unusual, often invisible, hazards such as aerial gunnery or guided missiles over international waters.
2—Unusual, often invisible, hazards such as artillery firing or missiles over military reservations.
3—Known wind shear areas in canyons and mountainous areas during certain seasons.
4—Student training areas or parachute jumping areas in or near heavily populated areas.

4324. When operating VFR in a MOA, a pilot

1—must obtain a clearance from the controlling agency prior to entering the MOA.
2—may operate only on the airways that transverse the MOA.
3—should exercise extreme caution when military activity is being conducted.
4—must operate only when military activity is not being conducted.

4325. Special authorization is required prior to conducting VFR flights within which airspace?

1—Alert areas.
2—Military operations areas.
3—Airport advisory areas.
4—Restricted areas.

4326. Stage III service in the terminal radar program provides

1—IFR separation (1,000 ft. vertical and 3 mi. lateral) between all aircraft.
2—warning to pilots when their aircraft are in unsafe proximity to terrain, obstructions, or other aircraft.
3—sequencing and separation for VFR aircraft.
4—service to aircraft principally during the en route phase of flight.

4327. If air traffic control advises that radar service is being terminated when you are departing a terminal radar service area, the transponder should be set to code

1—0000.
2—1200.
3—4096.
4—7700.

4328. When designated in conjunction with an airport which has a published instrument approach procedure, what airspace is defined as a transition area?

1—That airspace extending upward from 700 ft. or more AGL and terminating at the base of the overlying controlled airspace.
2—That airspace extending upward from the surface and terminating at the base of the overlying continental control area.
3—The airspace extending upward from the surface to 3,000 ft. within a 5 SM radius from the center of an airport.
4—Areas that are designated as Group I or Group II TCA's for which all aircraft are subject to the operating rules of FAR Part 91.

4329. Transition areas are designed for the purpose of

1—containing IFR operations within controlled airspace during terminal operations.
2—controlling all aircraft within 25 mi. of an airport that lies within a control zone.
3—extending control zones laterally from 5 to 25 mi. from the primary airport.
4—separating control zones from control areas.

4330. What is an airport advisory area?

1—That airspace within 5 SM of an airport extending up to, but not including 3,000 ft., within which a control tower is in operation.
2—That airspace within 10 SM of an airport which does not have a control tower but where an FSS is located.
3—That airspace identified by an area on the surface within which flight of an aircraft is subject to special restrictions.
4—The airspace which extends upward from the surface and terminates at the base of the continental control area.

4331. Uncontrolled airspace is the airspace where

1—ATC does not control air traffic.
2—ATC controls only IFR flights which originate in controlled airspace and terminate in controlled airspace.
3—the minimum visibility for flight is 1 mi.
4—only VFR rules apply.

4332. As standard operating practice, all inbound traffic to an airport without a control tower should continuously monitor the appropriate facility from a distance of

1—10 mi.
2—20 mi.
3—25 mi.
4—30 mi.

4333. When landing at an airport that does not have a tower, FSS, or UNICOM, you should broadcast your intentions in the blind on

1—123.0 MHz.
2—123.6 MHz.
3—121.5 MHz.
4—122.9 MHz.

4334. Upon landing at a controlled airport, you should switch to ground control

1—when the tower advises you to contact ground control.
2—only upon crossing the runway holding lines.
3—prior to turning off the runway.
4—only upon crossing the runway taxiway boundary.

4335. A clearance to taxi to the active runway means a pilot has been given permission to taxi

1—to the active runway and to take off.
2—via taxiways and across intersecting runways to, but not on, the active runway.
3—to and hold in takeoff position on the active runway.
4—on taxiways to the active runway without crossing any intersecting runways.

4336. Absence of the sky condition and visibility on an ATIS broadcast indicates that

1—the ceiling is at least 5,000 ft. and visibility is 5 mi. or more.
2—the sky condition is clear and visibility is unrestricted.
3—weather conditions are at or above VFR minimums.
4—the ceiling is at least 3,000 ft. and visibility is 7 mi. or more.

4337. When are ATIS broadcasts updated?

1—Every 30 min. if weather conditions are below basic VFR; otherwise, hourly.
2—Upon receipt of any official weather, regardless of content change or reported values.
3—Only when conditions change enough to require a change in the active runway or instrument approach in use.
4—Only when the ceiling and/or visibility changes by a reportable value.

4338. While flying on an east heading, a radar ATC facility issues the following warning:

"TRAFFIC 3 O'CLOCK, 2 MILES, WESTBOUND . . ."

You should look for this traffic in the direction of your airplane's

1—left wingtip, and ahead of you.
2—left wingtip.
3—right wingtip.
4—nose and slightly to the right.

4339. While flying in a TCA, you receive the following radar traffic advisory:

"TRAFFIC 11 O'CLOCK, 1 MILE, EASTBOUND . . ."

You should look for this traffic

1—off your right wingtip.
2—between the nose of the airplane and the right wingtip.
3—behind the left wingtip.
4—between the nose of the airplane and the left wingtip.

4340. Below FL180, en route weather advisories should be obtained from an FSS on

1—122.1 MHz.
2—122.0 MHz.
3—123.6 MHz.
4—122.4 MHz.

4341. If the aircraft's radio fails, what is the recommended procedure when landing at a controlled airport?

1—Observe the traffic flow, enter the pattern, and look for a light signal from the tower.
2—Enter a crosswind leg and rock your wings.
3—Flash your landing lights and cycle your landing gear while circling the airport.
4—Select 7700 on your transponder and fly a normal traffic pattern.

4342. Which transponder code should a civil pilot never use?

1—0001.
2—3333.
3—7500.
4—7777.

4343. Which action is appropriate if a pilot becomes involved in a hijacking?

1—Transmit and receive on the special emergency (air piracy) frequency, 128.5.
2—Append the code word PAPA to the aircraft call sign during all radio transmissions.
3—Transmit Code H on 121.5.
4—Set code 7500 on the aircraft transponder.

4344. Which distance is commonly displayed by the DME indicator?

1—Slant-range distance in nautical miles.
2—Slant-range distance in statute miles.
3—The distance from the aircraft to a point at the same altitude directly above the VORTAC.
4—Line-of-sight direct distance from aircraft to VORTAC in statute miles.

4345. Which DME indication should you receive when you are directly over a VORTAC site at approximately 6,000 ft. AGL?

1—0.
2—1.
3—1.3.
4—6.

4346. Which statement is true concerning the operation of DME?

1—Aircraft must have TACAN equipment to obtain distance information from a VORTAC.
2—DME operates in the VHF frequency band.
3—Distance information received from DME is the actual horizontal distance from the station.
4—DME coded identification is transmitted once for each three or four times that the VOR coded identification is transmitted.

4347. A particular VORTAC station is undergoing routine maintenance. This is evidenced by

1—removal of the voice feature of the TACAN.
2—broadcasting a maintenance alert notice on the voice channel.
3—removal of the identification feature.
4—transmitting a series of dashes after each identification signal.

4348. Refer to the Airport/Facility Directory, Figure 3. Select the true statement concerning the transcribed weather broadcast at Des Moines.

1—It is available from 1100 to 0400Z.
2—Des Moines does not have a transcribed weather broadcast.
3—To receive the broadcast, contact Des Moines FSS on 122.2.
4—It is transmitted continuously on 114.1.

4349. Refer to the Airport/Facility Directory, Figure 3. The longest runway at Des Moines Municipal Airport is

1—12R-30L.
2—12L-30R.
3—05-23.
4—23.

4350. Refer to the Airport/Facility Directory, Figure 3. On which frequency could you establish two-way communications with Des Moines FSS?

1—122.2.
2—114.4.
3—122.1.
4—119.55.

4351. Refer to the Airport/Facility Directory, Figure 3. VFR arrivals to Des Moines Municipal Airport on a heading of 170 and at an altitude below 5,000 ft., should contact approach control on

1—126.65 if landing on Rwy 30.
2—123.9 if landing on Rwy 12.
3—118.6 if landing on Rwy 05.
4—125.85 if landing on Rwy 30.

4352. Information concerning parachute jumping sites may be found in the

1—Graphic Notices and Supplemental Data.
2—legend of Sectional Aeronautical Charts only.
3—Airport/Facility Directory.
4—NOTAMS.

4353. How long will an FSS hold a VFR flight plan past the proposed departure time?

1—30 min.
2—1 hr.
3—2 hr.
4—No time limit.

4354. How soon after the ETA on a VFR flight plan will a search procedure be initiated?

1—15 min.
2—30 min.
3—45 min.
4—1 hr.

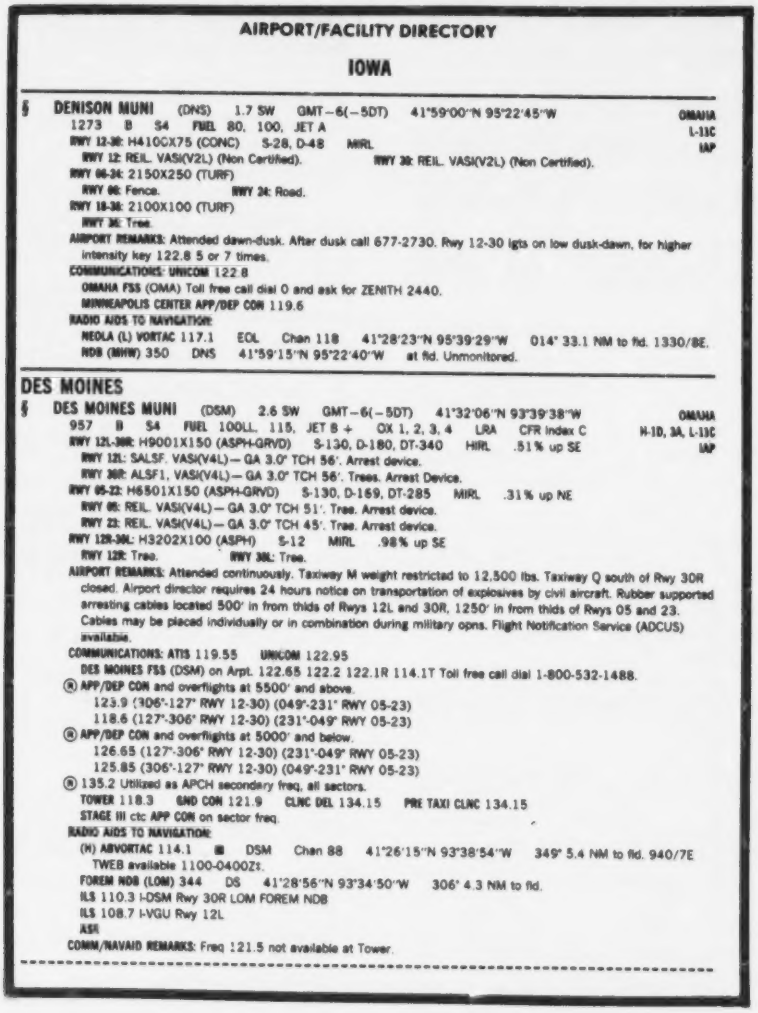
4355. Which statement is true regarding alcohol in the human system?

1—Aspirin increases the rate the body metabolizes alcohol.
2—Small amounts of alcohol in the human system increase judgment and decision-making abilities.
3—An increase in altitude decreases the adverse effect/influence of alcohol.
4—A common misconception is that coffee alters the rate the body metabolizes alcohol.

4356. Hypoxia is the result of which of these conditions?

1—Insufficient oxygen reaching the brain.
2—Excessive carbon dioxide in the bloodstream.
3—Excessive oxygen in the bloodstream.
4—Insufficient carbon dioxide in the bloodstream.

Figure 3



AIRPORT/FACILITY DIRECTORY

IOWA

§ **DENISON MUNI** (DNS) 1.7 SW GMT−6(−5DT) 41°59'00"N 95°22'45"W OMAHA
1273 B S4 FUEL 80, 100, JET A L-11C
RWY 12-30: H410GX75 (CONC) S-28, D-48 MIRL IAP
RWY 12: REIL. VASI(V2L) (Non Certified). RWY 30: REIL. VASI(V2L) (Non Certified).
RWY 06-24: 2150X250 (TURF)
RWY 06: Fence. RWY 24: Road.
RWY 18-36: 2100X100 (TURF)
RWY 36: Tree.
AIRPORT REMARKS: Attended dawn-dusk. After dusk call 677-2730. Rwy 12-30 lgts on low dusk-dawn, for higher intensity key 122.8 5 or 7 times.
COMMUNICATIONS: UNICOM 122.8
OMAHA FSS (OMA) Toll free call dial 0 and ask for ZENITH 2440.
MINNEAPOLIS CENTER APP/DEP CON 119.6
RADIO AIDS TO NAVIGATION:
NEOLA (L) VORTAC 117.1 EOL Chan 118 41°28'23"N 95°39'29"W 014° 33.1 NM to fld. 1330/8E.
NDB (MHW) 350 DNS 41°59'15"N 95°22'40"W at fld. Unmonitored.

DES MOINES

§ **DES MOINES MUNI** (DSM) 2.6 SW GMT−6(−5DT) 41°32'06"N 93°39'38"W OMAHA
957 B S4 FUEL 100LL, 115, JET B + OX 1, 2, 3, 4 LRA CFR Index C H-1D, 3A, L-11C
RWY 12L-30R: H9001X150 (ASPH-GRVD) S-130, D-180, DT-340 HIRL .51% up SE IAP
RWY 12L: SALSF. VASI(V4L)— GA 3.0° TCH 56'. Arrest device.
RWY 30R: ALSF1, VASI(V4L)— GA 3.0° TCH 56'. Trees. Arrest Device.
RWY 05-23: H6501X150 (ASPH-GRVD) S-130, D-169, DT-285 MIRL .31% up NE
RWY 05: REIL. VASI(V4L)— GA 3.0° TCH 51'. Tree. Arrest device.
RWY 23: REIL. VASI(V4L)— GA 3.0° TCH 45'. Tree. Arrest device.
RWY 12R-30L: H3202X100 (ASPH) S-12 MIRL .98% up SE
RWY 12R: Tree. RWY 30L: Tree.
AIRPORT REMARKS: Attended continuously. Taxiway M weight restricted to 12,500 lbs. Taxiway Q south of Rwy 30R closed. Airport director requires 24 hours notice on transportation of explosives by civil aircraft. Rubber supported arresting cables located 500' in from thlds of Rwys 12L and 30R, 1250' in from thlds of Rwys 05 and 23. Cables may be placed individually or in combination during military opns. Flight Notification Service (ADCUS) available.
COMMUNICATIONS: ATIS 119.55 UNICOM 122.95
DES MOINES FSS (DSM) on Arpt. 122.65 122.2 122.1R 114.1T Toll free call dial 1-800-532-1488.
(R) APP/DEP CON and overflights at 5500' and above.
123.9 (306°-127° RWY 12-30) (049°-231° RWY 05-23)
118.6 (127°-306° RWY 12-30) (231°-049° RWY 05-23)
(R) APP/DEP CON and overflights at 5000' and below.
126.65 (127°-306° RWY 12-30) (231°-049° RWY 05-23)
125.85 (306°-127° RWY 12-30) (049°-231° RWY 05-23)
(R) 135.2 Utilized as APCH secondary freq, all sectors.
TOWER 118.3 GND CON 121.9 CLNC DEL 134.15 PRE TAXI CLNC 134.15
STAGE III ctc APP CON on sector freq.
RADIO AIDS TO NAVIGATION:
(H) ABVORTAC 114.1 IB DSM Chan 88 41°26'15"N 93°38'54"W 349° 5.4 NM to fld. 940/7E
TWEB available 1100-0400Z‡.
FOREM NDB (LOM) 344 DS 41°28'56"N 93°34'50"W 306° 4.3 NM to fld.
ILS 110.3 I-DSM Rwy 30R LOM FOREM NDB
ILS 108.7 I-VGU Rwy 12L
ASR
COMM/NAVAID REMARKS: Freq 121.5 not available at Tower.

4357. Which statement concerning hypoxia is true?

1—It is possible to predict exactly when and at what flight level hypoxia will occur, and how it will manifest itself.
2—Tingling of the skin and a false sense of security may be symptoms of hypoxia.
3—Hypoxia is caused by nitrogen bubbles in the joints and bloodstream.
4—Forcing oneself to concentrate on the flight instruments will help to overcome the effects of hypoxia.

4358. Without the use of supplemental oxygen, crewmembers and passengers would suffer from hypoxia in high altitude unpressurized flight. This problem occurs because as altitude is increased

1—nitrogen in the atmosphere and in the bloodstream expands.
2—the percentage of oxygen in the atmosphere is decreased.
3—oxygen partial pressure is decreased.
4—the percentage of nitrogen in the atmosphere is increased.

4359. Which would most likely result in hyperventilation?

1—Insufficient carbon dioxide.
2—Excessive carbon monoxide.
3—Insufficient oxygen.
4—Excessive carbon dioxide.

4360. Rapid or extra deep breathing while using oxygen can cause a condition known as

1—hypoxia.
2—aerosinusitis.
3—aerotitis.
4—hyperventilation.

4361. A pilot should be able to overcome the symptoms or avoid future occurrences of hyperventilation by

1—closely monitoring the flight instruments to control the airplane.
2—slowing the breathing rate, breathing into a bag, or talking aloud.
3—increasing the breathing rate in order to increase lung ventilation.
4—refraining from the use of over-the-counter remedies and drugs such as antihistamines, cold tablets, tranquilizers, etc.

4362. Susceptibility to carbon monoxide poisoning increases as

1—altitude increases.
2—altitude decreases.
3—air pressure increases.
4—humidity of the air decreases.

4363. Breathing carbon monoxide results in

1—an increased sense of well-being.
2—an increase in mental activity.
3—reduced ability to reason and make decisions.
4—increased muscular activity.

4364. Which procedure is recommended to prevent or overcome spatial disorientation?

1—Reduce head and eye movements to the greatest extent possible.
2—Rely on the kinesthetic sense.
3—Avoid steep turns and rough control movements.
4—Rely entirely on the indications of the flight instruments.

4365. When the hairs in the semicircular canals of the inner ear are deflected, the pilot may experience

1—discomfort or pain on the ear drum.
2—spatial disorientation.
3—hyperventilation.
4—hypoxia.

4366. Which occurs when climbing above 28,000 ft. in an unpressurized airplane without supplemental oxygen?

1—The oxygen pressure within the lungs cannot be maintained without an increase in inhaled oxygen pressure.
2—The pressure in the middle ear becomes less than the atmospheric pressure in the cabin.
3—Vision improves significantly as altitude increases because carbon dioxide is released from the body.
4—Gases trapped in the body contract and prevent nitrogen from escaping the bloodstream.

4367. Why is medical oxygen not recommended for use as supplemental oxygen in aircraft?

1—It is too dry and could cause irritation on the lungs.
2—It contains medicinal properties that may have adverse effects at altitude.
3—It is available only in high-pressure cylinders, which are dangerous in aircraft.
4—It may contain moisture, which could freeze.

4368. The most frequent type of ground or surface based temperature inversion is that produced by

1—terrestrial radiation on a clear, relative still night.
2—warm air being lifted rapidly aloft in the vicinity of mountainous terrain.
3—the movement of colder air under warm air, or the movement of warm air over cold air.
4—widespread sinking of air within a thick layer aloft resulting in heating by compression.

4369. Which weather conditions should be expected beneath a low-level temperature inversion layer when the relative humidity is high?

1—Smooth air and poor visibility due to fog, haze, or low clouds.
2—Light wind shear and poor visibility due to haze and light rain.
3—Turbulent air and poor visibility due to fog, low stratus type clouds, and showery precipitation.
4—Updrafts and turbulence due to surface heating, fair visibility, and cumulus clouds developing at the top of the inversion.

4370. What are the standard temperature and pressure values for sea level?

1—15° C and 29.92″ Hg.
2—59° C and 1013.2 millibars.
3—59° F and 29.92 millibars.
4—15° C and 1013.2″ Hg.

4371. If the air temperature is +16° C at an elevation of 3,000 ft. and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1—7,000 ft. MSL.
2—9,000 ft. MSL.
3—11,000 ft. MSL.
4—14,000 ft. MSL.

4372. If the air temperature is +8° C at an elevation of 1,350 ft. and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1—3,350 ft. MSL.
2—5,350 ft. MSL.
3—9,350 ft. MSL.
4—10,285 ft. MSL.

4373. What causes wind?

1—Coriolis force.
2—The Earth's rotation.
3—Air mass modification.
4—Pressure differences.

4374. What prevents air from flowing directly from high-pressure areas to low-pressure areas?

1—Coriolis force.
2—Katabatic force.
3—Pressure gradient force.
4—Surface friction.

4375. Which force, in the Northern Hemisphere, acts at a right angle to the wind and deflects it to the right until parallel to the isobars?

1—Centrifugal.
2—Pressure gradient.
3—Coriolis.
4—Advective.

4376. The general circulation of air associated with a high-pressure area in the Northern Hemisphere is

1—inward, downward, and counterclockwise.
2—outward, downward, and clockwise.
3—outward, upward, and counterclockwise.
4—inward, upward, and clockwise.

4377. Winds at 5,000 ft. AGL on a particular flight are southwesterly while most of the surface winds are southerly. This difference in direction is primarily due to

1—a stronger pressure gradient at higher altitudes.
2—friction between the wind and the surface.
3—stronger Coriolis force at the surface.
4—the influence of pressure systems at the lower altitudes.

4378. In the Northern Hemisphere, a pilot making a long distance flight from east to west would most likely find favorable winds associated with high- and low-pressure systems by flying

1—to the north of a high and to the south of a low.
2—to the south of a high and to the north of a low.
3—through the center of highs and lows.
4—to the north of a high.

4379. When flying into a low-pressure area in the Northern Hemisphere, the wind direction and velocity will be from the

1—left and decreasing.
2—left and increasing.
3—right and decreasing.
4—right and increasing.

4380. Which statement is true regarding actual air temperature and dew point temperature spread?

1—The temperature spread decreases as the relative humidity decreases.
2—The temperature spread decreases as the relative humidity increases.
3—The temperature spread increases as the relative humidity increases.
4—Temperature and dew point spread are not related to relative humidity.

4381. The ratio of the existing water vapor in the air, as compared to the maximum amount that could exist at a given temperature, is called

1—convergence.
2—saturation point.
3—relative humidity.
4—the dew point.

4382. What is meant by the term dew point?

1—The temperature to which air must be cooled to become saturated.
2—The temperature at which condensation and evaporation are equal.
3—The temperature at which dew will always form.
4—The spread between actual temperature and the temperature during evaporation.

4383. What is the process by which ice can form on a surface directly from water vapor on a cold, clear night?

1—Sublimation.
2—Evaporation.
3—Supersaturation.
4—Condensation.

4384. Stability can be determined from which measurement of the atmosphere?

1—Low-level winds.
2—Ambient lapse rate.
3—Atmospheric pressure.
4—Difference between standard temperature and surface temperature.

4385. The formation of either predominantly stratiform or predominantly cumuliform clouds is dependent upon the

1—temperature of the air being lifted.
2—source of lift.
3—percent of moisture content of the air being lifted.
4—stability of the air being lifted.

4386. The conditions necessary for the formation of cumulonimbus clouds are a lifting action and

1—stable, dry air.
2—unstable, dry air.
3—unstable, moist air.
4—stable, moist air.

4387. Consider the following air mass characteristics:

A. Smooth air (above the friction level) and poor visibility.
B. Turbulence up to about 10,000 ft. and good visibility, except in areas of precipitation.
C. Cumuliform clouds.
D. Stratiform clouds and fog.
E. Stable lapse rate.
F. Unstable lapse rate.

A moist air mass which is colder than the surface over which it passes, frequently has which of the above characteristics?

1—A, D, and E.
2—B, D, and E.
3—B, C, and F.
4—A, D, and F.

4388. At approximately what altitude above the surface would you expect the base of cumuliform clouds if the surface air temperature is 82° F and the dew point is 55° F?

1—5,000 ft. MSL.
2—6,000 ft. MSL.
3—7,000 ft. MSL.
4—8,000 ft. MSL.

4389. The weather condition normally associated with unstable air is

1—fair to poor visibility.
2—good visibility, except in blowing sand or snow.
3—stratiform clouds.
4—continuous precipitation.

4390. Which condition is most likely to exist within a stable air mass?

1—Good visibility at the surface.
2—Moderate to severe turbulence in low levels.
3—Smoke, dust, haze, etc., concentrated in lower levels with resulting poor visibility.
4—Towering cumulus and cumulonimbus clouds.

4391. One weather phenomenon which will always occur when flying across a front is

1—a change in the wind.
2—a large precipitation area, if the frontal surface is steep.
3—a large temperature change, especially at high altitudes.
4—the presence of clouds, either ahead of or behind the front.

4392. Which of the following in-flight hazards is most commonly associated with warm fronts?

1—Precipitation-induced fog.
2—Ice fog.
3—Advection fog.
4—Radiation fog.

4393. Consider the following statements about mountain waves:

A. Mountain waves always develop in a series on the upwind (windward) side of mountain ridges.
B. In a mountain wave, the air dips sharply downward immediately to the lee side of a ridge, before rising and falling in a wave motion for a considerable distance downstream.
C. If the air is humid and the wave is of large amplitude, lenticular (lens-shaped) clouds mark the wave's crest.
D. In a typical wave, the greatest amplitude is seldom more than 1,000 ft. above the ridge crest elevation.

Select from the statements above those which are true.

1—B, C.
2—A, B, C.
3—A, C, D.
4—A, B, C, D.

4394. In strong wind conditions, flight over a mountainous area within close proximity to the peaks may be hazardous because of

1—violent downdrafts on the windward side.
2—violent downdrafts on the leeward side.
3—strong turbulence associated with stratus clouds.
4—wind shear on the windward side.

4395. Low-level wind shear occurs

1—when surface winds are 15 kts. and there is no change in wind direction and windspeed with height.
2—after a warm front has passed.
3—when there is a low-level temperature inversion with strong winds above the inversion.
4—when surface winds are light and variable.

4396. The most rapid accumulation of clear ice on an airplane in flight may occur with temperatures between 0° C to −15° C in

1—ice fog.
2—any clouds or dry snow.
3—cumuliform clouds.
4—stratiform clouds.

4397. Select the true statement regarding aircraft structural icing.

1—It is unnecessary for an aircraft to fly through rain or cloud droplets for structural ice to form.
2—Clear ice is most likely to form on an airplane when flying through stratified clouds or light drizzle.
3—In order for structural ice to form, the temperature at the point where moisture strikes the aircraft must be 0° C (32° F) or colder.
4—Rime ice gradually freezes on an airplane's surface becoming a smooth sheet of solid ice.

4398. What are the requirements for the formation of a thunderstorm?

1—Sufficient water vapor and a lifting action.
2—A cumulus cloud with sufficient moisture.
3—A cumulus cloud with sufficient moisture and an inverted lapse rate.
4—Sufficient moisture, an unstable lapse rate, and lifting action.

4399. Select the true statement pertaining to the life cycle of a thunderstorm.

1—The beginning of rain at the Earth's surface indicates the mature stage of the thunderstorm.
2—The beginning of rain at the Earth's surface indicates the dissipating stage of the thunderstorm.
3—Updrafts continue to develop throughout the dissipating stage of a thunderstorm.
4—The initial stage of a thunderstorm is always indicated by the development of a nimbus cloud.

4400. Thunderstorms are produced by which type of clouds?

1—Nimbostratus.
2—Altostratus.
3—Cumulonimbus.
4—Stratocumulus.

4401. The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with

1—fast-moving warm fronts.
2—slow-moving cold fronts.
3—slow-moving warm fronts.
4—squall line and steady-state thunderstorms.

4402. Tornadoes are most likely to occur with which type of thunderstorms?

1—Squall line thunderstorms that form ahead of warm fronts.
2—Tropical thunderstorms during the mature stage.
3—Steady-state thunderstorms associated with cold fronts or squall lines.
4—Air mass thunderstorms.

4403. A squall line is usually associated with

1—a fast-moving cold front.
2—a fast-moving warm front.
3—a stationary front.
4—an occluded front.

4404. Consider the following statements with relation to hail as an in-flight hazard to aircraft, and select those which are correct.

A. There is a useful correlation between the external visual appearance of thunderstorms and the amount of hail within them.
B. Large hail is most commonly found in thunderstorms which have strong updrafts and large liquid water content.
C. Hail may be found at any level within a thunderstorm, but not in the clear air outside of the storm cloud.
D. Hail is usually produced during the mature stage of the thunderstorm's lifespan.
E. Hailstones may be thrown upward and outward from a storm cloud for several miles.

The true statements are:

1—B, D, E.
2—A, B, C.
3—A, B, C, D, E.
4—A, B, D, E.

4405. With respect to advection fog, which statement is true?

1—It forms almost exclusively at night or near daybreak.
2—It forms when unstable air is cooled adiabatically.
3—It is slow to develop, and dissipates quite rapidly.
4—It can appear suddenly during day or night, and it is more persistent than radiation fog.

4406. What situation is most conducive to the formation of radiation fog?

1—Warm, moist air over low, flatland areas on clear, calm nights.
2—Moist, tropical air moving over cold, offshore water.
3—The movement of cold air over much warmer water.
4—Light wind moving warm, moist air upslope during the night.

4407. In what ways do advection fog, radiation fog, and steam fog differ in their formation or location?

1—Advection fog deepens as windspeed increases up to 20 kts.; steam fog requires calm or very light wind; radiation fog forms when the ground or water cools the air by radiation.
2—Radiation fog is restricted to land areas; advection fog is most common along coastal areas; steam fog forms over a water surface.
3—Steam fog forms from moist air moving over a colder surface; advection fog requires cold air over a warmer surface; radiation fog is produced by radiational cooling of the ground.
4—Radiation fog results from cooling the air to its dew point, while steam and advection fog require the addition of moisture to the air near the surface, through evaporation.

SELECTED SURFACE AVIATION WEATHER REPORTS

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SA 3Ø17Ø1
FTW SA 1654 -X M6 OVC 11/2HK 69/63/Ø9Ø4/Ø1Ø/ F2 TWR VSBY 21/2 CIG RGD
DFW SA 1646 M8 OVC 4F 193/68/64/11Ø5/Ø111
DAL SA 1649 M9 OVC 4FH 72/63/ØØØØ/Ø1Ø
TYR SA 165Ø -X 15 SCT 3F 76/66/Ø8Ø4/999/F2
ABI SA 1651 3Ø SCT E2ØØ OVC 25 168/74/51/1614/ØØ8 CB W-N
AMA SA 1651 M5 OVC 4F 217/51/48/Ø516/Ø23/LB26E4Ø
AUS RS 1651 M1Ø BKN 24 BKN 16Ø OVC 4R-H 169/7Ø/63/12Ø8/ØØ5/RB25
BRO SA 1655 2Ø SCT 13Ø SCT E25Ø OVC 7 149/85/67/1515G2Ø/997/
RB19E25 TCU ALQDS
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Figure 4

4408. Refer to Figure 4. Which station is reporting the wind as calm?

1—FTW.
2—DAL.
3—DFW.
4—TYR.

4409. Refer to Figure 4. In the report for TYR, what does the F2 mean?

1—Tower visibility is reported as 2 mi.
2—Rainfall in the past 24 hr. was 2 in.
3—The runway visual range is 2,000 ft.
4—Two-tenths of the sky is obscured by fog.

4410. Refer to Figure 4. What is the reported duration of the rain at the time of the observation at AUS?

1—36 min.
2—26 min.
3—25 min.
4—24 min.

4411. Refer to Figure 4. What does the LB26E40 mean at the end of the report for AMA?

1—The wind in the vicinity of rain showers was estimated at 26 to 40 kts.
2—Lightning began at 1726.
3—There are large buildups to the east with wind gusting to 40 kts.
4—Drizzle began at 26 past the hour and ended at 40 past the hour.

4412. Refer to Figure 4. Which station is reporting the lowest visibility?

1—AUS.
2—TYR.
3—ABI.
4—FTW.

4413. Refer to Figure 5. What is the temperature for 6,000 ft. at AMA?

1—The temperature is standard for that altitude.
2—+4° C.
3—+8° C.
4—No temperatures are forecast for levels within 2,500 ft. of station elevation.

4414. Refer to Figure 5. Why is there no wind forecast for 3,000 and 6,000 ft. at ABQ?

1—No winds are forecast within 1,500 ft. of station elevation.
2—Winds less than 10 kts. are omitted from the forecast.
3—No winds are forecast within 3,000 ft. of station elevation.
4—Wind which is expected to be light and variable is omitted.

4415. Refer to Figure 5. What is the forecast wind for 12,000 ft. at AMA?

1—Calm.
2—090° at 9 kts.
3—090° in excess of 50 kts.
4—Light and variable.

4416. Refer to Figure 5. What is the temperature at 30,000 ft. for DAL?

1—+40° C.
2—-40° C.
3—+40° F.
4—-40° F.

4417. Refer to Figure 5. What is the forecast wind at 6,000 ft. for ABI?

1—140° at 11 kts.
2—010° at 40 kts.
3—140° at 9 kts.
4—014° at 9 kts.

WIND AND TEMPERATURES ALOFT FORECAST

FDUS1 KWBC 3Ø164Ø
DATA BASED ON 3Ø12ØØZ

VALID 3Ø18ØØZ FOR USE 17ØØ-21ØØZ. TEMPS NEG ABV 24ØØØ

FT	3ØØØ	6ØØØ	9ØØØ	12ØØØ	18ØØØ	24ØØØ	3ØØØØ	34ØØØ	39ØØØ
ABI		14Ø9+11	1611+Ø6	16Ø9+Ø1	16Ø8-13	1815-25	19244Ø	19255Ø	19196Ø
ABQ			13Ø7+Ø8	16Ø8+Ø1	2ØØ5-13	25Ø8-26	271642	282151	29246Ø
AMA		Ø4Ø8	Ø9Ø5+Ø5	99ØØ+ØØ	21Ø8-13	2214-25	232141	232351	232261
BRO	99ØØ	2211+14	2314+Ø9	2318+Ø4	2428-1Ø	2336-23	234739	235448	246358
DAL	1ØØ8	15Ø6+11	17Ø5+Ø7	2ØØ6+Ø1	221Ø-13	2217-24	22274Ø	223Ø49	23296Ø
ICT	3514	3412+Ø6	321Ø+Ø3	291Ø-Ø1	2618-13	2526-26	253542	254Ø52	254463

Figure 5

4418. Refer to Figure 6. What is the visibility forecast for BRO?

1—4 mi.
2—1 mi.
3—3 mi.
4—Greater than 6 mi.

4419. Refer to Figure 6. What type of weather can be expected after 0400Z at DAL?

1—At least a ceiling of 1,000 ft. and visibility of 3 mi.
2—Ceiling of more than 3,000 ft. and visibility greater than 5 mi.
3—VFR with a slight chance of the visibility being 2 mi. with thundershowers and fog.
4—VFR with wind in excess of 25 kts.

4420. Refer to Figure 6. What is the lowest ceiling forecast for AUS?

1—500 ft.
2—1,400 ft.
3—200 ft.
4—2,000 ft.

4421. Refer to Figure 6. Which of the stations are forecasting the wind to be less than 10 kts. for the entire forecast period?

1—ABI.
2—ACT.
3—BRO.
4—AUS and ACT.

4422. Refer to Figure 6. The valid time for the forecasts is from

1—1000Z on the 30th until 1000Z on the following day.
2—0940Z on the 30th until 0940Z the following day.
3—1000Z on the 30th until 2200Z on the 30th.
4—1010Z on the 30th until 1000Z the following day.

SELECTED TERMINAL FORECASTS

FT 3ØØ94Ø
ABI 3Ø1Ø1Ø C25Ø BKN 1413. 12Z 2Ø SCT C1ØØ BKN 1615 CHC C14 OVC 1TRW. 18Z 3Ø SCT C1ØØ BKN 1716 CHC C1Ø OVC 1TRW. Ø2Z 8Ø SCT C25Ø BKN Ø4Z VFR..

ACT 3Ø1Ø1Ø C1 X 1/2F VRBL C7 BKN 3F. 17Z C2Ø BKN CHC C12 OVC 2TRW. Ø4Z VFR CIG ABV 1Ø THSD BCMG IFR CIG TRWF..

AMA 3Ø1Ø1Ø C8 OVC 3R-F Ø314 CHC C5 OVC 1TRW-F. 17Z C18 BKN Ø418 CHC C8 OVC 1TRWF. 2ØZ C3Ø BKN 1417 CHC C1Ø OVC 1TRW+F. Ø4Z MVFR CIG..

AUS 3Ø1Ø1Ø C5 OVC 2F. 14Z C14 OVC 151Ø CHC TRW. 2ØZ C2Ø OVC 151Ø CHC C5 OVC 2TRW G25. Ø2Z C12 OVC 1Ø1Ø CHC TRW. Ø4Z MVFR CIG TRW..

BRO 3Ø1Ø1Ø 4Ø SCT C15Ø OVC 121Ø. 14Z C3Ø BKN 1512 CHC RW/TRW. Ø2Z C12 OVC 1Ø1Ø CHC RW/TRW. Ø4Z MVFR CIG TRW..

DAL 3Ø1Ø1Ø 8Ø SCT C25Ø 4F VRBL C4 OVC 1F. 16Z C18 BKN Ø512 SLGT CHC C12 OVC 2TRWF. 19Z 3Ø SCT C 8Ø BKN Ø612 SCT CHC C1Ø OVC 1TRWF. Ø4Z VFR..

Figure 6

AREA FORECAST EXCERPT

```
DFWC FA 231040
SGFNT CLOUD AND WX VALID UNTIL 232300...OTLK 232300-240500
.
IFR...OK TX AR LA TN MS AL
FROM YDR TO YQT TO YYZ TO FWA TO CHA TO 60SE MSY TO LCH TO TXK TO
LBB TO SLN TO ISN TO YDR
OCNL CIGS BLO 10 OVC AND VSBYS BLO 3SF NRN AND WRN PTN AND RF
ELSW. CONDS SLOLY DMSHG FROM SW BUT CONTG BYD 23Z.
.
OK
CIGS 10-15 OVC LYRD TO 120. OCNL CIGS BLO 10 OVC AND VSBYS BLO
3R-S-F. 19Z CIGS 20 BKN-OVC 80 BKN 120. 22Z AGL 20-30 SCT-BKN 60.
OTLK...VFR.
.
NWRN TX
CIGS 20-30 BKN 80. OCNL CIGS BLO 10 TIL 16Z ERN PMHDL.
18Z AGL 30-50 SCT. OTLK...VFR.
.
SWRN TX
NO CIG BLO 120. OTLK...VFR.
.
NCNTRL AND NERN TX
AGL 15-20 SCT-BKN 50 BKN-OVC 120. ISOLD RW-. 18Z AGL 20-30 SCT
80 BKN 120. OTLK...VFR.
.
SCNTRL TX SERN TX AND CSTL WTRS
CSTL PLAIN SERN AND CSTL WTRS..CIGS 15-20 BKN-OVC 40 OVC 15. SCT
TRW WITH CB TOPS 450 EXTRM SERN AND CSTL WTRS TIL 15Z. 16Z CIGS
30 BKN-SCT 80 BKN 120. OTLK...VFR.
RMNDR SCNTRL TX..CIGS 30-50 BKN 80 BKN 121. 16Z 80 BKN 120.
OTLK...VFR.
.
AR LA AND CSTL WTRS
CIGS 10-15 OVC LYJD TO 180. OCNL CIGS BLO 10 OVC AND VSBYS BLO
3R-F. SCT TRW WITH CB TOPS 450 SLOLY ENDG FROM W. 18Z CIGS 20 BKN
60 BKN-OVC 120. ISOLD TRW- WITH CB TOPS 350 SERN LA. 21Z AGL
30-50 SCT 80 BKN 120 LA AND CIGS 20-30 BKN-SCT 80 BKN 120 AR.
OTLK...VFR.
.
WRN TWO THIRDS TN MS AND CSTL WTRS
CIGS 10-15 OVC LYRD TO 150. OCNL CIGS BLO 10 OVC AND VSBYS BLO
3R-F. SCT TRW WITH CB TOPS 450. OTLK...MVFR CIG RW.
.
ERN THIRD IN
AGL 20 SCT 30-50 BKN-OVC LYRD TO 120. 15Z CIGS 20-30 BKN 50 OVC
LYRD TO 150. WDLY SCT TRW WITH CB TOPS 450. OTLK...MVFR CIG TRW.
.
AL
NWRN HALF..CIGS 10 OVC LYRD TO 150. WDWY SCT RW- WITH OCNL CIGS
BLO 10 OVC AND VSBYS BLO 3R-F TIL 17Z. WDLY SCT TRW WITH CB TOPS
450 AFT 13Z. OTLK...MVFR CIG TRW.
SERN HALF AND CSTL WTRS..CIGS 15-20 BKN-OVC LYRD TO 150 WITH WDLY
SCT RW- SWRN PIN. LCL CIGS BLO 10 OVC AND VSBYS BLO 3R-F TIL 16Z.
WDLY SCT TRW- WITH CB TOPS 450 AFT 16Z. OTLK...MVFR CIG TRW.
...
```

Figure 7

4423. In Area Forecasts, cloud heights are given in reference to

1—ground level only.
2—density altitude.
3—pressure altitude.
4—sea level or ground level.

4424. To determine the freezing level and areas of probable icing aloft, you should refer to the

1—Radar Summary Chart.
2—Weather Depiction Chart.
3—Area Forecast.
4—Surface Analysis.

4425. For a brief summary of the location and movement of fronts, pressure systems, and circulation patterns, the pilot should refer to the

1—Terminal Forecast.
2—Radar Summary Chart.
3—Stability Chart.
4—Area Forecast.

4426. Refer to Figure 7. What is the forecast for northwestern Alabama after 2300Z?

1—IFR with widely scattered thunderstorms.
2—Ceilings below 1,000 ft. and visibility restricted to 3 mi. by light rain and fog.
3—Ceilings of 1,000 to 3,000 ft. and/or visibility of 3 to 5 mi. with possible rain showers.
4—Ceilings greater than 3,000 ft. and visibility more than 5 mi.

4427. Refer to Figure 7. The forecast is valid for

1—24 hours with an additional 12-hour outlook.
2—18 hours with an additional 12-hour outlook.
3—12 hours with an additional 6-hour outlook.
4—6 hours with an additional 6-hour outlook.

4428. Refer to Figure 7. What is the forecast visibility for south-central Texas for the period ending 2300Z?

1—This visibility is not forecast.
2—Less than 3 mi.
3—More than 6 mi.
4—At least 5 mi.

4429. Refer to Figure 8. Which is a true statement?

1—The pilot reported a north wind at 30 kts. at BRO.
2—There are moderate buildups west of ABI.
3—It is clear above 8500 at DAL.
4—The visibility at ABI is 15 mi.

4430. Refer to Figure 8. Turbulence was reported west of

1—DAL.
2—ABI.
3—AUS.
4—BRO.

4431. Refer to Figure 8. Which is the true statement?

1—Moderate turbulence was reported by a pilot east of ABI.
2—Rime ice was reported west of AUS below 9,000 ft.
3—The base of the overcast at AUS was reported to be 13,000 ft.
4—Thunderstorms were reported north of BRO.

4432. Refer to Figure 8. The lowest cloudbase reported is

1—4,500 ft. at DAL.
2—5,000 ft. at BRO.
3—1,300 ft. at AUS.
4—500 ft. at BRO.

PILOT REPORTS

UA /OV DAL Ø9ØØ15 1725 FLØ9Ø /TP BE55
/SK Ø45 OVC Ø85 CLR ABV

UA /OV ABI 27ØØ15 1845 FL12Ø /TP C411
/TB MDT BLO-1ØØ

UA /OV AUS 315Ø2Ø 1715 FL15Ø /TP C500
/SK OVC 13Ø /IC TRACE RIME DURGC WBND Ø9Ø-13Ø

UA /OV BRO 36ØØ3Ø 17ØØ FLØ45 /TP PA31
/SK Ø5Ø OVC /RM LRG TSTM 5ØN BRO 2Ø WIDE

Figure 8

4433. What information would be covered in an AIRMET?

1—Embedded thunderstorms.
2—Hail of 3/4 in. or greater diameter.
3—Severe turbulence.
4—Extensive mountain obscurement.

4434. Which in-flight advisory would contain information on severe icing?

1—Convective SIGMET.
2—SIGMET.
3—AIRMET.
4—PIREP.

4435. What information is contained in a convective SIGMET in the conterminous U.S.?

1—Tornadoes, embedded thunderstorms, and hail 3/4 in. or greater in diameter.
2—Severe icing, severe turbulence, or widespread dust storms lowering visibility to less than 3 mi.
3—Weather less than basic VFR and sustained winds of 30 kts. or greater at the surface.
4—Ceilings less than 500 ft. and visibility less than 1 mi.

4436. Interpret the following radar weather report:

LIT 1133 AREA 4TRW+/+ 22/100 88/170 196/180 220/115 C2425 MT 310 AT 162/110

Which statement is true concerning the report?

1—The maximum top of the cells is located 162° and 110 NM from the station (LIT).
2—There are four cells with tops at 10,000 ft., 17,000 ft., and 11,500 ft.
3—The cells are moving in a direction of 162° at 10 kts.
4—The visibility is 4 mi. in thunderstorms and the intensity of thunderstorms remains unchanged.

4437. Which statement is true concerning this radar weather report for OKC?

OKC 1934 LN 8TRW++/+ 86/40 164/60 199/115 15W 2425 MT 570 AT 159/65 2 INCH HAIL RPRTD THIS ECHO.

1—The visibility is 8 mi. in rain showers.
2—The line of cells is moving 080° with winds reported up to 40 kts.
3—There are three cells with tops at 11,500, 40,000, and 60,000 ft.
4—The maximum top of the cells is 57,000 ft. located 65 NM south–southeast of the station.

4438. Radar weather reports are of special interest to pilots because they report

1—large areas of low ceilings and fog.
2—location of precipitation along with type, intensity, and trend.
3—location of broken to overcast clouds.
4—icing conditions.

4439. By referring to the isobars on a Surface Analysis (weather map), what can a person determine?

1—Areas of magnetic variation.
2—Areas of precipitation.
3—Pressure gradient.
4—Temperature changes.

4440. The intensity trend of a front (as of map time) is best determined by referring to a

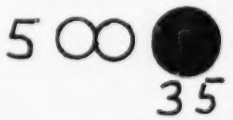
1—Radar Summary Chart.
2—Surface Analysis.
3—Constant Pressure Chart.
4—Weather Depiction Chart.

4441. Which of the following symbols used on a Surface Analysis (weather map) represents a stationary front?

4442. What does this symbol mean on a Surface Analysis (weather map)?

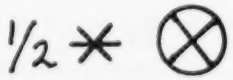
1—Cold front aloft.
2—Occluded front.
3—High–pressure ridge.
4—Squall line.

4443. On a Weather Depiction Chart, what does this information mean?



1—Visibility 5 mi., haze, overcast, ceiling 3,500 ft.
2—Visibility 3 to 5 mi., dust, sky obscured.
3—Visibility 3 to 5 mi., sky obscured, ceiling 5,000 ft.
4—Visibility 5 mi., sky obscured.

4444. On a Weather Depiction Chart, what does this information mean?



1—Visibility unlimited, sky overcast, base of clouds variable 100 to 200 ft., wind calm.
2—Visibility 1/2 mi., snow, sky partially obscured.
3—Visibility 1 to 2 mi., blowing sand, sky overcast.
4—Visibility less than 1 mi., blowing dust, sky broken clouds.

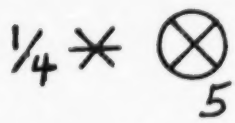
4445. On a Weather Depiction Chart, what weather conditions would be contained in an unshaded area that is enclosed by a smooth line?

1—Ceiling greater than 3,000 ft. and/or visibility greater than 5 mi.
2—Ceiling between 5,000 and 7,000 ft. and/or visibility greater than 5 mi.
3—Ceiling less than 1,000 ft. and/or visibility less than 3 mi.
4—Ceiling between 1,000 and 3,000 ft. and/or visibility between 3 and 5 mi.

4446. A Weather Depiction Chart is useful to a pilot in determining

1—areas of equal barometric pressure.
2—the temperature and dew point at selected stations.
3—the forecast areas of cloud cover and precipitation.
4—areas where weather conditions were reported above or below VFR minimums.

4447. On a Weather Depiction Chart, what does this information mean?



1—Sky obscured, ceiling 500 ft., visibility 1/4 mi., snow.
2—Sky broken clouds, ceiling variable from 400 to 1,000 ft., snow, wind 5 kts.
3—Sky overcast, ceiling variable from 400 to 1,000 ft., visibility 5 mi., dust.
4—Sky overcast, ceiling 400 ft. with top at 1,000 ft., visibility 5 mi., snow.

4448. A Radar Summary Chart helps a pilot in planning a safe flight because it graphically displays a collection of radar reports concerning

1—fog and other obscurations.
2—the intensity and movement of precipitation.
3—clouds and in-flight visibilities.
4—clouds and ceiling heights.

4449. What information is provided by the Radar Summary Chart?

1—Areas of clear weather.
2—Lines, cells, and areas of hazardous thunderstorms.
3—Ceilings and precipitation between reporting stations.
4—Areas of cloud cover and fog.

4450. Which weather chart depicts the conditions forecast to exist at a specific time in the future?

1—Surface Analysis.
2—Prognostic.
3—Weather Depiction.
4—Radar Summary.

4451. Select the true statement concerning U.S. Low Level Significant Weather Prognostic Charts.

1—This is a four-panel chart that forecasts the weather for a period of 48 hr.
2—The valid time of the charts corresponds to the time of the plotted observations and they are not forecasts.
3—The charts are designed for use in domestic flight planning to 24,000 ft.
4—These charts do not depict ceiling, visibility, or turbulence.

4452. From which of the following can the observed temperature, wind, and temperature/dew point spread be determined at specified flight levels?

1—Winds Aloft Forecasts.
2—Significant Weather Prognostic Charts.
3—Constant Pressure Charts.
4—Stability Charts.

4453. When using a Constant Pressure Chart for planning a flight at 10,000 ft. MSL, to which of the following should the pilot refer?

1—850-millibar chart.
2—700-millibar chart.
3—500-millibar chart.
4—200-millibar chart.

4454. Which of the following statements about longitude and latitude is true?

1—Lines of longitude cross the Equator at right angles.
2—Lines of latitude are drawn from the North Pole to the South Pole.
3—The 0° line of latitude passes through Greenwich, England.
4—Lines of longitude are parallel to the Equator.

4455. Sectional charts for the conterminous United States are updated each

1—3 mo.
2—6 mo.
3—12 mo.
4—24 mo.

4456. How is a control zone depicted on Sectional Aeronautical Charts?

1—A blue airport symbol.
2—A blue dashed line encircling the airport.
3—The letters CT in the airport data box.
4—A magenta colored band surrounding the airport.

4457. Which statement is true relating to the blue and magenta colors used to depict airports on Sectional Aeronautical Charts?

1—Airports having air-to-ground communications are shown in blue; airports with no means of communication are shown in magenta.
2—Airports having runways capable of handling large aircraft are shown in blue; all others in magenta.
3—Airports having airport traffic areas are shown in blue; all others in magenta.
4—Airports having concrete runways are shown in blue; all others in magenta.

4458. True course measurements on a Sectional Aeronautical Chart should be made using a meridian near the midpoint of the course because the

1—isogonic lines are not parallel.
2—meridians converge toward the poles and the angles formed by lines of longitude and the course vary from point to point.
3—geographic North Pole from which direction is measured is not located at the magnetic North Pole.
4—lines of latitude vary from point to point.

4459. GIVEN:

Ambient temperature..... +10° C
Calibrated altitude.....6,200 ft. MSL
Pressure altitude.....6,000 ft. MSL

The true altitude is approximately

1—6,100 ft. MSL.
2—6,225 ft. MSL.
3—6,350 ft. MSL.
4—6,450 ft. MSL.

4460. GIVEN:

Ambient temperature..... +15° C
Calibrated altitude.....8,300 ft. MSL
Pressure altitude.....8,500 ft. MSL

The true altitude is approximately

1—8,325 ft. MSL.
2—8,400 ft. MSL.
3—8,550 ft. MSL.
4—8,700 ft. MSL.

4461. GIVEN:

Ambient temperature..... +18° C
Calibrated altitude.....5,800 ft. MSL
Pressure altitude.....5,700 ft. MSL

The true altitude is approximately

1—5,750 ft. MSL.
2—5,800 ft. MSL.
3—6,050 ft. MSL.
4—6,175 ft. MSL.

4462. Determine the approximate CAS you should use to obtain 180 kts. TAS with a pressure altitude of 8,000 ft. and a temperature of +4° C.

1—150 kts.
2—158 kts.
3—164 kts.
4—166 kts.

4463. What calibrated airspeed is required to obtain 170 kts. TAS with a pressure altitude of 11,500 ft. and a temperature of −8° C?

1—143 kts.
2—148 kts.
3—151 kts.
4—154 kts.

4464. At speeds below 200 kts. (where compressibility is not a factor), true airspeed can be found by correcting

1—indicated airspeed for indicated altitude and temperature.
2—indicated airspeed for true altitude and temperature.
3—calibrated airspeed for pressure altitude and temperature.
4—calibrated airspeed for atmospheric pressure and temperature.

4465. Refer to Figure 9. What is the elevation of New River Valley Airport, point A?

1—1,227 ft. MSL.
2—2,000 ft. MSL.
3—2,500 ft. MSL.
4—2,105 ft. MSL.

4466. Refer to Figure 9. What is the elevation of the top of the obstruction southwest of Mercer County Airport, point B?

1—2,805 ft. AGL.
2—205 ft. MSL.
3—2,805 ft. MSL.
4—5,100 ft. MSL.

4467. Refer to Figure 9. Where does the floor of controlled airspace begin over New River Valley Airport (point A) if the weather is IFR?

1—Surface.
2—700 ft. AGL.
3—1,200 ft. AGL.
4—700 ft. MSL.

4468. Refer to Figure 9. What is the runway length at Mercer County Airport, point B?

1—2,857 ft.
2—3,093 ft.
3—4,700 ft.
4—4,000 ft.

4469. GIVEN:

True airspeed.....120 MPH
Wind.....030° at 18 kts.

What is the magnetic heading and estimated time en route from airport A to airport C? (See Figure 9.)

1—344° and 29 min.
2—333° and 28 min.
3—339° and 30 min.
4—334° and 27 min.

4470. Refer to Figure 9. En route from airport A to airport C you tune in Bluefield VORTAC and set your OBS to 060°. What indication will you receive on your omnireceiver if you are on course and 15 mi. from airport C?

1—TO with a right-needle deflection.
2—TO with a left-needle deflection.
3—FROM with a left-needle deflection.
4—FROM with a right-needle deflection.

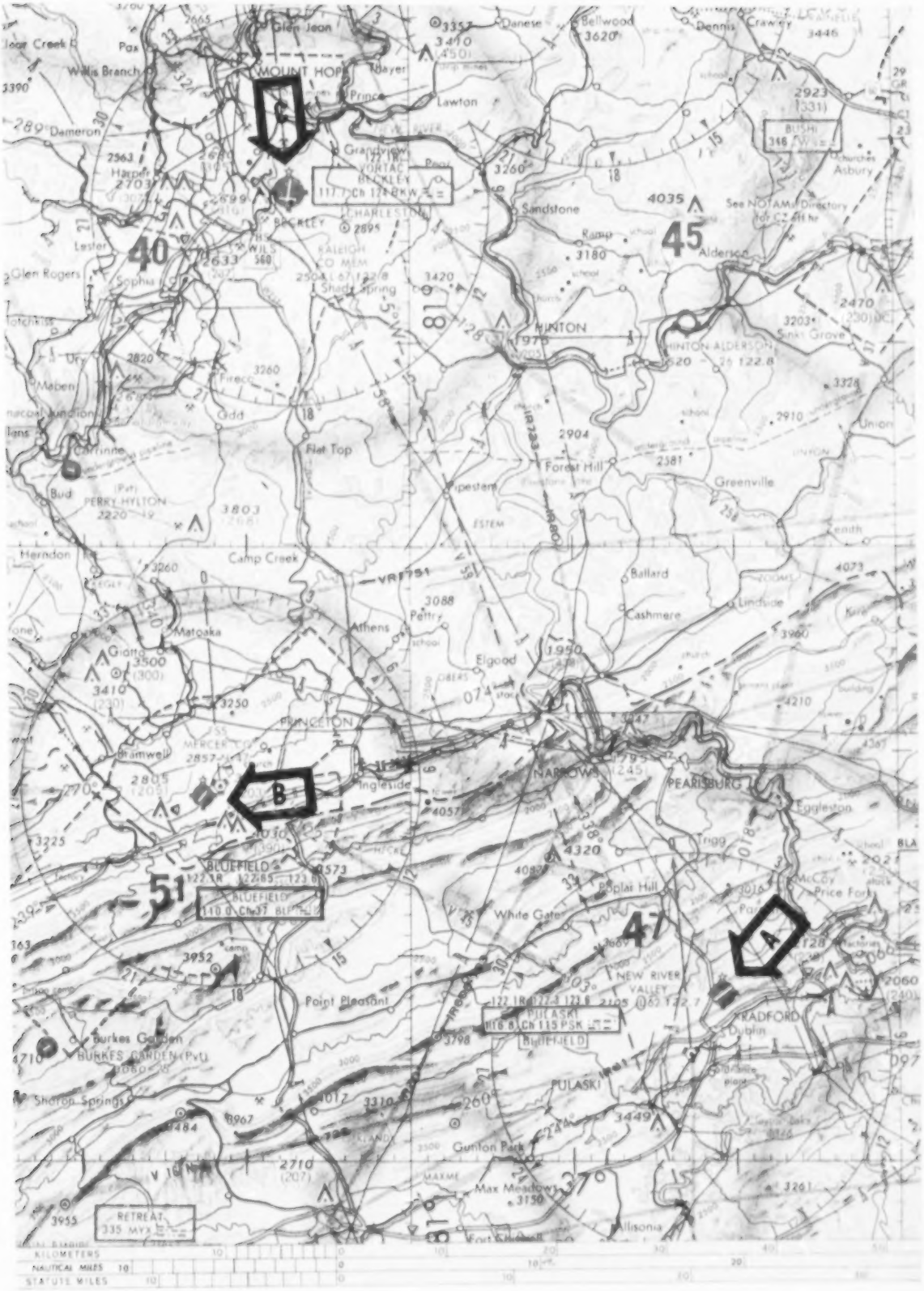

C
1
B
A
MOUNT HOPE
Lawton
Grandview
BECKLEY
117.7 Ch 124 BKW
Sandstone
Alderson
HINTON
Flat Top
Forest Hill
Greenville
Camp Creek
Ballard
Cashmere
Athens
Elgood
Ingleside
NARROWS
PEARISBURG
BLUEFIELD
110.0 Ch 37 BLF
White Gate
Poplar Hill
Point Pleasant
PULASKI 116.8 Ch 115 PSK
BLUEFIELD
NEW RIVER VALLEY
RADFORD
Dublin
PULASKI
Gunlon Park
Max Meadows
RETREAT
335 MYX
Fort Chiswell
Allisonia
Sharon Springs
Burkes Garden
Bud
Maben
Glen Rogers
Lester
Dameron
Pax
Glen Jean
Danese
Bellwood
Dennis Crawley
Union
Greenville
Ripetown
Herndon
Matoaka
Bramwell
Tngg
McCoy
Price Fork
Eggleton
Churches
Asbury
Sinks Grove
Ripley
Union
KILOMETERS
NAUTICAL MILES
STATUTE MILES

Figure 9

4471. Refer to Figure 10. If over Georgetown VORTAC, on what frequency would you communicate with Utica FSS?

1—Transmit and receive on 122.1.
2—Transmit on 122.1 and receive on 115.2.
3—Transmit and receive on 115.2.
4—Transmit on 115.2 and receive on 122.1.

4472. Refer to Figure 10. What is the floor of the TRSA if you are 15 mi. from airport A en route to airport B?

1—6,000 ft.
2—3,500 ft.
3—3,100 ft.
4—2,500 ft.

4473. Refer to Figure 10. What does the number 27 in the southeast portion of the chart represent?

1—Maximum elevation, including terrain and obstructions, in the quadrangle bounded by ticked lines of latitude and longitude.
2—The floor of the TRSA for the area east of the center of Broome County Airport.
3—The minimum altitude to clear the highest obstacle in the quadrangle bounded by ticked lines of latitude and longitude by 1,000 ft.
4—The altitude of the highest obstacle within 4 mi. either side of the centerline of V34.

4474. Refer to Figure 10. Select the true statement concerning Broome County Airport, point D.

1—The control tower frequency is 123.0.
2—Runway lighting is in operation from sunset to sunrise.
3—The airport elevation is 1,804 ft.
4—The control tower is only in operation part time.

4475. GIVEN:

True airspeed ..... 135 kts.
Wind ..... 120° at 20 kts.

What is the true heading and groundspeed from airport A to airport B? (See Figure 10.)

1—329° and 153 kts.
2—330° and 103 kts.
3—341° and 152 kts.
4—317° and 105 kts.

4476. Refer to Figure 10. En route from airport B to airport C you cross the 350 radial of Binghamton VORTAC at 1320Z and the 020 radial at 1331Z. What is your ETA over airport C?

1—1338Z.
2—1342Z.
3—1346Z.
4—1351Z.

4477. Refer to Figure 10. En route from airport B to airport C you determine you are crossing the 253 radial from Georgetown VORTAC and the 007 radial from Binghamton VORTAC. What is your position?

1—North of course near an outdoor theater.
2—On course over Cortland Co. Chase Field.
3—Southeast of course over the town of McGraw.
4—On course 18 mi. from airport B.

4478. A descent is planned from 8,500 ft. MSL when 20 NM from destination airport. If the groundspeed is 150 kts. and you desire to be at 4,500 ft. MSL when over the airport, the rate of descent should be

1—400 ft./min.
2—500 ft./min.
3—600 ft./min.
4—700 ft./min.

4479. A pilot plans to begin descending from 8,000 ft. MSL when 20 SM from a VORTAC. If the groundspeed is 180 MPH and the pilot wants to arrive over the VORTAC at 5,500 ft. MSL, the rate of descent should be

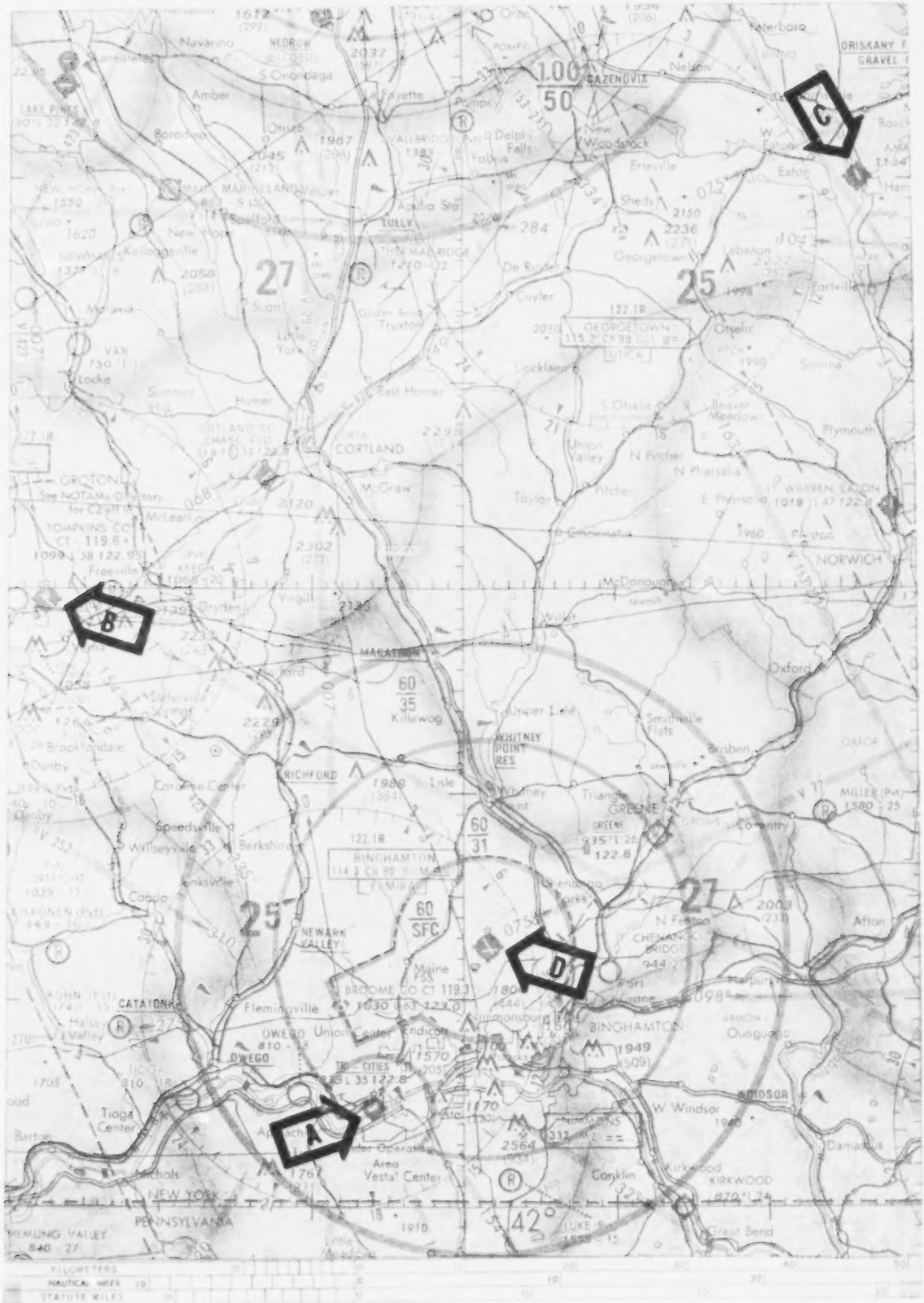
1—250 ft./min.
2—378 ft./min.
3—416 ft./min.
4—875 ft./min.

4480. A descent is planned from 11,500 ft. MSL to arrive at 7,000 ft. MSL 5 SM from a VORTAC. With a groundspeed of 160 MPH and a rate of descent of 600 ft./min., at what distance from the VORTAC should the descent be started?

1—18 SM.
2—20 SM.
3—25 SM.
4—29 SM.

4481. A descent is planned from 7,500 ft. MSL so as to arrive at 1,000 ft. MSL 6 NM from a VORTAC. With a groundspeed of 156 kts. and a rate of descent of 800 ft./min., at what distance from the VORTAC should the descent be started?

1—11.7 NM.
2—15 NM.
3—27 NM.
4—30.2 NM.


A
B
C
D
BINGHAMTON
NORWICH
CORTLAND
OWEGO
GREENE
MARATHON
NEWARK VALLEY
RICHFORD
WHITNEY POINT RES
GAZENOVIA
GEORGETOWN
Tioga Center
Area Vestal Center
Conklin
Endicott
Johnson City
Maine
Nimmons
Nimmonsburg
Fleming
Flemingville
Speedsville
Willseyville
Berkshire
Freeville
Dryden
Virgil
Homer
Cincinnatus
Oxford
Smithville Flats
Sherburne
Afton
Chenango Bridge
Triangle
Whitney Point
Lisle
Killawog
Locke
Moravia
Scipio
Auburn
Skaneateles
Navarino
Amber
Otisco
Borodino
Apulia Sta
Tully
Fabius
Pompey
Fayetteville
Manlius
Jamesville
Delphi Falls
Erieville
Eaton
Sheds
Georgetown
Lebanon
Earlville
Otselic
Plymouth
Union Valley
Pitcher
Taylor
Willet
Virgil
Freeville
Groton
Brookfield
Danby
Candor
Owego
Tioga
Nichols
Barton
Waverly
Sayre
Athens
Towanda
Troy
Wyalusing
Great Bend
Kirkwood
Windsor
Damascus
Ouaquaga
Harpursville
Bainbridge
Guilford
Sherburne
Norwich
Plymouth
Oriskany
Utica
Rome
Verona
Sylvan Beach
Canastota
Cazenovia
Peterboro
Nelson
New Woodstock
Cuyler
Truxton
Preble
Homer
Cortland
McGraw
Marathon
Lisle
Whitney Point
Triangle
Greene
Chenango Bridge
Binghamton
Endicott
Johnson City
Maine
Nimmons
Nimmonsburg
Conklin
Kirkwood
Windsor
Owego
Tioga Center
Nichols
Barton
Waverly
Sayre
Athens
Towanda
Troy
Wyalusing
Great Bend
Afton
Oxford

4482. GIVEN:

Departure path.....straight out
Takeoff time.....1030 DST
Winds during climb.....180°/30 kts.
True course during climb.....160°
Airport elevation.....1,500 ft.
True airspeed.....125 kts.
Rate of climb.....500 ft./min.

What would be the distance and time upon reaching 8,500 ft. MSL?

1—20 NM and 1047 DST.
2—23 NM and 1044 DST.
3—25 NM and 1047 DST.
4—30 NM and 1044 DST.

4483. GIVEN:

Departure path.....straight out
Takeoff time.....1435Z
Winds during climb.....175°/25 kts.
True course during climb.....155°
Airport elevation.....2,000 ft.
True airspeed.....130 kts.
Rate of climb.....500 ft./min.

What would be the distance and time upon reaching 8,000 ft. MSL?

1—21 NM and 1447Z.
2—24 NM and 1452Z.
3—27 NM and 1455Z.
4—30 NM and 1500Z.

4484. GIVEN:

Distance.....340 SM
True course.....260°
Wind.....245° at 45 kts.
True airspeed.....135 MPH
Rate of fuel consumption.....12.7 gal./hr.

What would be the approximate groundspeed and amount of fuel consumed?

1—90 MPH; 47.3 gal.
2—74 kts.; 50.1 gal.
3—84 MPH; 51.2 gal.
4—80 kts.; 55.3 gal.

4485. GIVEN:

Distance.....200 SM
True course.....320°
Wind.....215° at 25 kts.
True airspeed.....128 MPH
Rate of fuel consumption.....19 gal./hr.

What would be the approximate groundspeed and amount of fuel consumed?

1—117 kts.; 27.3 gal.
2—132 MPH; 28.9 gal.
3—127 MPH; 33.3 gal.
4—115 kts.; 31.5 gal.

4486. GIVEN:

Usable fuel at takeoff.....36 gal.
Fuel consumption rate.....12.4 gal./hr.
Constant groundspeed of.....140 kts.
Flight time since takeoff.....48 min.

Based on the above information, how much farther can be flown on the fuel remaining?

1—152 NM.
2—180 NM.
3—294 NM.
4—383 NM.

4487. GIVEN:

Usable fuel at takeoff.....40 gal.
Fuel consumption rate.....13.3 gal./hr.
Constant groundspeed of.....120 kts.
Flight time since takeoff.....1 hr. 20 min.

Based on the above information, how much farther can be flown on the fuel remaining?

1—160 NM.
2—180 NM.
3—200 NM.
4—240 NM.

4488. If fuel consumption is 15.3 GPH and groundspeed is 167 kts., how much fuel is required for an aircraft to travel 620 NM?

1—66 gal.
2—63 gal.
3—60 gal.
4—57 gal.

4489. If an aircraft is consuming 80 lb. of fuel per hour at a cruising altitude of 6,500 ft. and the groundspeed is 180 kts., how much fuel is required to travel 610 NM?

1—304 lb.
2—295 lb.
3—285 lb.
4—271 lb.

4490. If an aircraft is consuming 91 lb. of fuel per hour at a cruising altitude of 6,500 ft. and the groundspeed is 168 kts., how much fuel is required to travel 457 NM?

1—248 lb.
2—265 lb.
3—291 lb.
4—391 lb.

4491. If an aircraft is consuming 11.5 gal. of fuel per hour at a cruising altitude of 8,500 ft. and the groundspeed is 155 kts., how much fuel is required to travel 445 NM?

1—26 gal.
2—28 gal.
3—30 gal.
4—33 gal.

4492. On a cross-country flight, point C is crossed at 0900 hr. and the plan is to reach point D at 0925 hr. Use the following information to determine the indicated airspeed required to reach point D on schedule.

Distance between C and D.....68 NM
Forecast wind.....295°/25 kts.
Pressure altitude.....7,000 ft.
Ambient temperature.....+10° C
True course.....175°

The required indicated airspeed would be approximately

1—135 kts.
2—144 kts.
3—166 kts.
4—172 kts.

4493. On a cross-country flight, point A is crossed at 1500 hr. and the plan is to reach point B at 1530 hr. Use the following information to determine the indicated airspeed required to reach point B on schedule.

Distance between A and B.....70 NM
Forecast wind.....310°/15 kts.
Pressure altitude.....8,000 ft.
Ambient temperature.....-10° C
True course.....270°

The required indicated airspeed would be approximately

1—126 kts.
2—137 kts.
3—152 kts.
4—168 kts.

4494. On a cross-country flight, point X is crossed at 1015 and arrival at point Y is expected at 1025. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X and Y.....27 NM
True course.....100°
Pressure altitude.....5,500 ft.
Ambient temperature.....+05° C
Forecast wind.....240°/30 kts.

The required indicated airspeed would be approximately

1—128 kts.
2—140 kts.
3—162 kts.
4—171 kts.

4495. On a cross-country flight, point X is crossed at 1550 and the plan is to reach point Y at 1620. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X and Y.....70 NM
Forecast wind.....115°/25 kts.
Pressure altitude.....8,000 ft.
Ambient temperature.....-05° C
True course.....088°

The required indicated airspeed would be approximately

1—138 kts.
2—143 kts.
3—162 kts.
4—184 kts.

4496. GIVEN:

Groundspeed.....155 kts.
Elapsed time.....2 min.

What is the distance traveled?

1—2.58 NM.
2—3.10 NM.
3—5.16 NM.
4—6.32 NM.

4497. If the groundspeed is 215 kts., how far will the aircraft travel in 3 min. elapsed time?

1—1.28 NM.
2—3.58 NM.
3—6.45 NM.
4—10.75 NM.

4498. How far will an aircraft travel in 3-1/2 min. if its groundspeed is 165 kts.?

1—1.3 NM.
2—9.6 NM.
3—12.8 NM.
4—28.2 NM.

4499. After 141 mi. are flown from the departure point, the aircraft's position is located 11 mi. off course. If 71 mi. remain to be flown, what approximate total correction should be made to converge on the destination?

1—4°.
2—8°.
3—11°.
4—14°.

4500. After 150 mi. are flown from the departure point, the aircraft's position is located 8 mi. off course. If 160 mi. remain to be flown, what approximate total correction should be made to converge on the destination?

1—3°.
2—6°.
3—9°.
4—12°.

4501. After 155 mi. are flown from the departure point, the aircraft's position is located 10 mi. off course. If 80 mi. remain to be flown, what approximate total correction should be made to converge on the destination?

1—4°.
2—7°.
3—11°.
4—14°.

4502. After 240 mi. are flown from the departure point, the aircraft's position is located 25 mi. off course. If 100 mi. remain to be flown, what approximate total correction should be made to converge on the destination?

1—6°.
2—15°.
3—21°.
4—30°.

4503. A true heading of 125° results in a ground track of 115°. With a true airspeed of 160 MPH and a groundspeed of 135 MPH, the wind is from

1—073°/36 MPH.
2—145°/29 MPH.
3—164°/37 MPH.
4—175°/36 MPH.

4504. If a true heading of 135° results in a ground track of 130° and a true airspeed of 135 kts. results in a groundspeed of 140 kts., the wind would be from

1—019°/12 kts.
2—166°/14 kts.
3—200°/13 kts.
4—246°/13 kts.

4505. If a true heading of 350° results in a ground track of 335° and a true airspeed of 140 kts. results in a groundspeed of 115 kts., the wind would be from

1—015°/30 kts.
2—035°/40 kts.
3—215°/40 kts.
4—290°/40 kts.

4506. If a true heading of 230° results in a ground track of 250° and a true airspeed of 160 kts. results in a groundspeed of 175 kts., the wind would be from

1—135°/59 kts.
2—165°/60 kts.
3—270°/37 kts.
4—343°/60 kts.

4507. GIVEN:

Forecast wind.....265°/20 kts.
Pressure altitude.....8,000 ft.
Ambient temperature..... –15° C
Indicated airspeed.....140 kts.
Variation.....10° E.
True course.....175°

Determine the approximate magnetic heading and groundspeed.

1—165°/141 kts.
2—165°/154 kts.
3—173°/153 kts.
4—183°/153 kts.

4508. GIVEN:

True course.....258°
Variation.....10° E.
Indicated airspeed.....142 kts.
Ambient temperature..... +05° C
Pressure altitude.....6,500 ft.
Forecast wind.....350°/30 kts.

Under these conditions, the magnetic heading and groundspeed would be approximately

1—236°/157 kts.
2—270°/157 kts.
3—260°/155 kts.
4—148°/155 kts.

4509. GIVEN:

True course.....330°
Variation.....15° E.
Indicated airspeed.....160 kts.
Ambient temperature..... –10° C
Pressure altitude.....4,500 ft.
Forecast wind.....090°/25 kts.

Under these conditions, the magnetic heading and groundspeed would be approximately

1—003°/166 kts.
2—323°/177 kts.
3—332°/166 kts.
4—340°/177 kts.

4510. GIVEN:

True course.....238°
Variation.....3° W.
Indicated airspeed.....160 kts.
Ambient temperature..... –15° C
Pressure altitude.....8,500 ft.
Forecast wind.....160°/25 kts.

Under these conditions, the magnetic heading and groundspeed would be approximately

1—224°/171 kts.
2—233°/171 kts.
3—241°/178 kts.
4—249°/171 kts.

4511. Which statement is true regarding tracking on a desired bearing when using ADF during crosswind conditions?

1—When on the desired track inbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the nose position.
2—When on the desired track outbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the tail position.
3—To track either inbound or outbound, heading corrections should be made away from the ADF pointer.
4—To track outbound, heading corrections should be made away from the ADF pointer.

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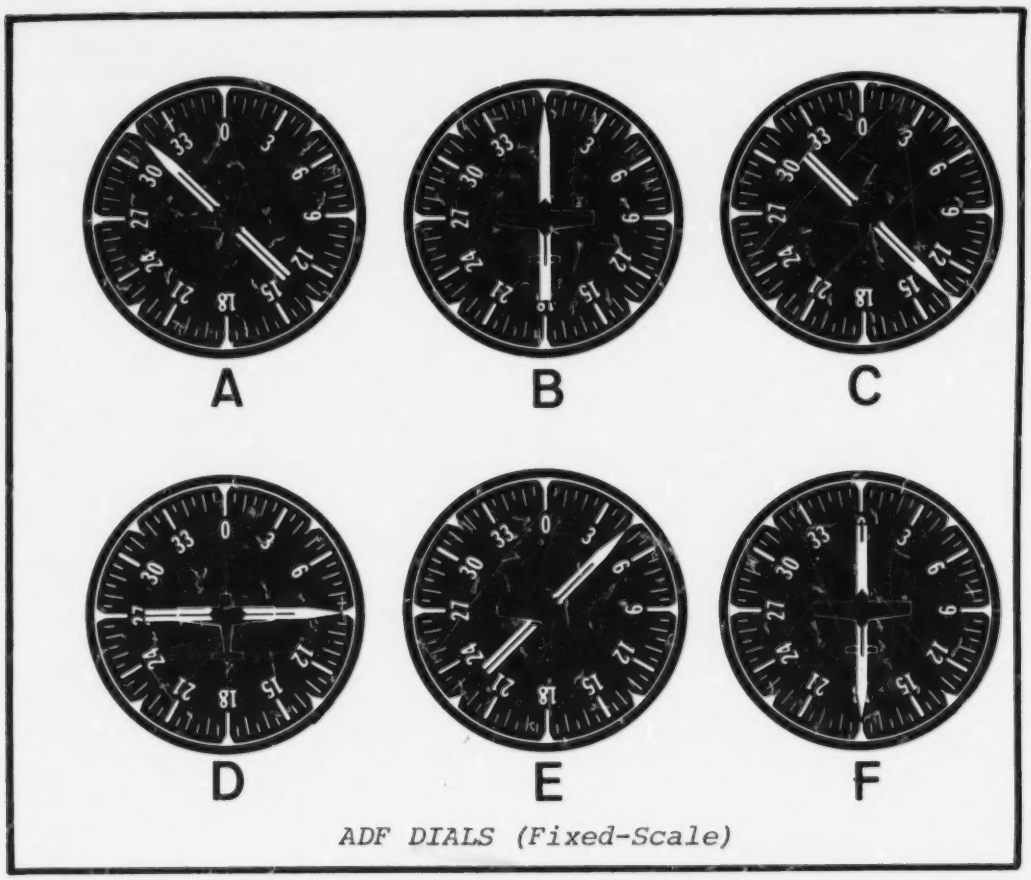


Figure 11

4512. Refer to Figure 11. If a magnetic heading of 050° is maintained and you are receiving ADF indication E, what will be the relative bearing to the station when you intercept the 180° magnetic bearing to the station?

1—180°.
2—130°.
3—310°.
4—230°.

4513. Refer to Figure 11. If a magnetic heading of 170° is maintained and you are receiving ADF indication A, what will be the relative bearing to the station when you intercept the 090° magnetic bearing to the station?

1—280°.
2—090°.
3—260°.
4—270°.

4514. Refer to Figure 11. If on a magnetic heading of 030° and receiving ADF indication E, to what heading should the aircraft be turned to intercept the 150° bearing from the station at a 30° angle?

1—270°.
2—210°.
3—180°.
4—120°.

4515. Refer to Figure 11. If on a magnetic heading of 270° and receiving ADF indication B, to what heading should the aircraft be turned to intercept the 350° bearing from the station at a 20° angle?

1—330°.
2—290°.
3—010°.
4—190°.

4516. Refer to Figure 11. If on a magnetic heading of 240° and receiving ADF indication B, what would be the magnetic bearing to the station?

1—360°.
2—180°.
3—240°.
4—060°.

4517. Refer to Figure 11. If on a magnetic heading of 010° and receiving ADF indication F, what would be the magnetic bearing to the station?

1—360°.
2—190°.
3—180°.
4—010°.

4518. Refer to Figure 11. If on a magnetic heading of 310° and receiving ADF indication C, what would be the magnetic bearing to the station?

1—135°.
2—315°.
3—085°.
4—265°.

4519. Refer to Figure 11. If on a magnetic heading of 045°, which ADF indicator would show a magnetic bearing to the station of 090°?

1—A.
2—D.
3—E.
4—F.

4520. Refer to Figure 11. If on a magnetic heading of 090°, which ADF indicator would show a magnetic bearing to the station of 180°?

1—A.
2—B.
3—D.
4—F.

4521. Refer to Figure 11. If on a magnetic heading of 120°, which ADF indicator would show a magnetic bearing to the station of 210°?

1—A.
2—C.
3—D.
4—E.

4522. Refer to Figure 11. If on a magnetic heading of 060°, which ADF indicator shows you to be southwest of the station?

1—B.
2—C.
3—D.
4—F.

4523. The ADF is tuned to a nondirectional radiobeacon and the relative bearing changes from 090° to 100° in 1.5 minutes' elapsed time. The time en route to that station would be

1—6 min.
2—9 min.
3—12 min.
4—15 min.

4524. The ADF indicates a 5° wingtip bearing change in 2.5 minutes' elapsed time. If the TAS is 125 kts., the distance to the station would be

1—26.0 NM.
2—31 2 NM.
3—56.5 NM.
4—62.5 NM.

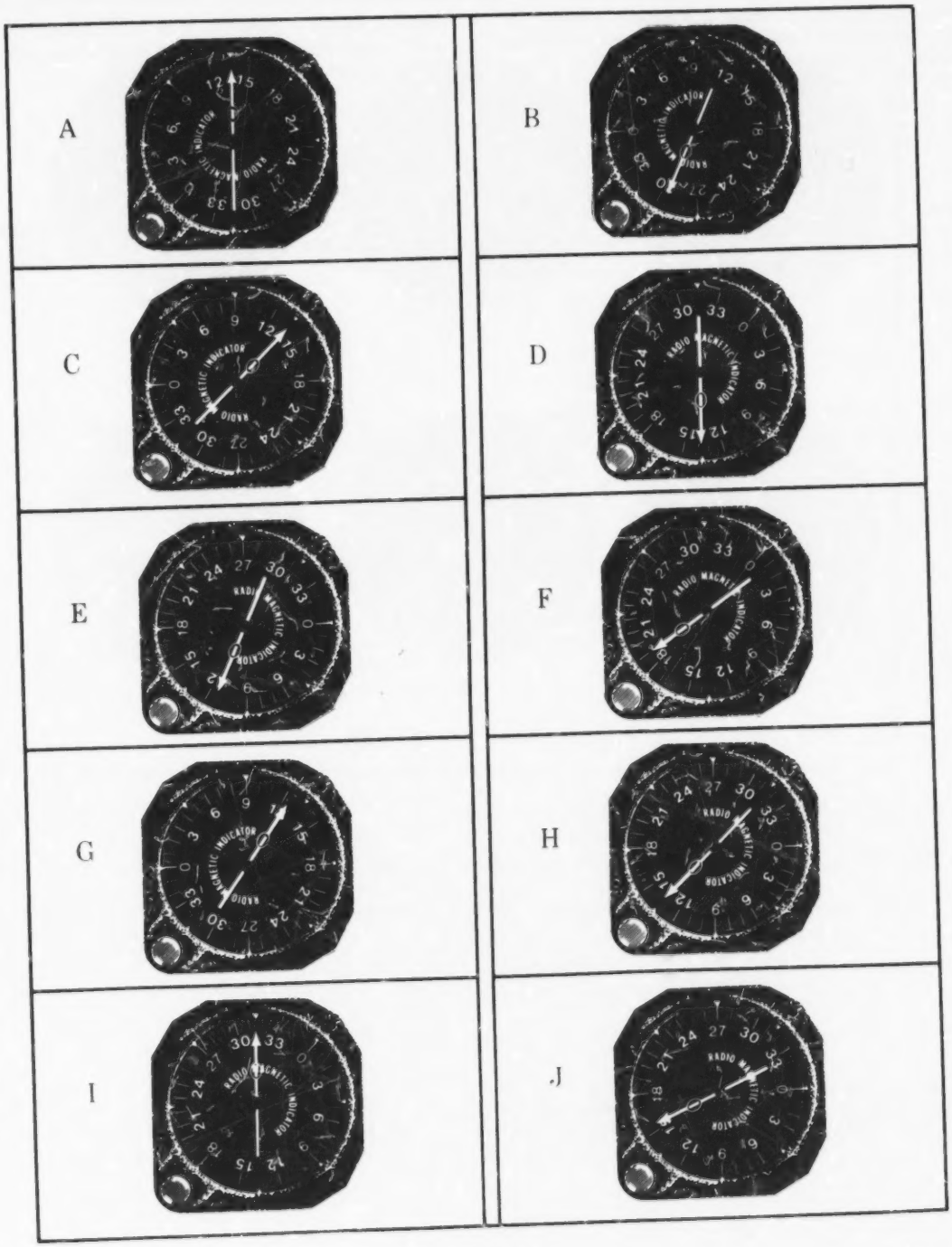


Figure 12

4525. Refer to Figure 12. Which RMI indicator shows your position to be northwest of the station?

1—A.
2—B.
3—I.
4—F.

4526. Refer to Figure 12. Which RMI indicator shows you crossing the 115° bearing from the station?

1—A.
2—B.
3—C.
4—D.

4527. Refer to Figure 12. RMI indicator B shows the magnetic bearing to the station to be

1—090°.
2—115°.
3—270°.
4—295°.

4528. Refer to Figure 12. Which RMI indicator shows you outbound on the 315 radial?

1—A.
2—D.
3—G.
4—I.

4529. What is the relationship of VHF radio reception and altitude?

1—VHF reception distance varies in proportion to the altitude of the receiving equipment.
2—Unlike reception with L/MF (low or medium frequency) equipment, VHF reception is not subject to line-of-sight restrictions.
3—VHF reception distance remains constant regardless of altitude.
4—Reception of VHF signals is more subject to signal fades and interference from distant stations than reception of L/MF (low or medium frequency) signals.

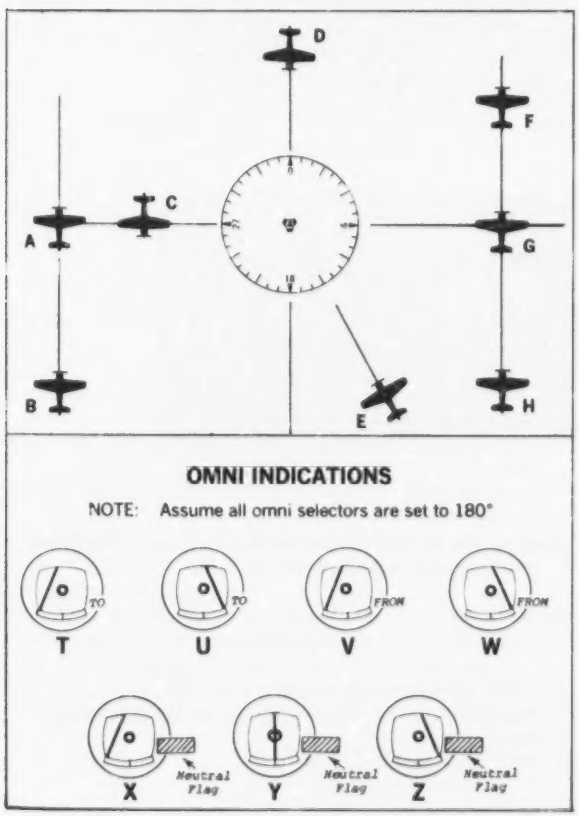


Figure 13

4530. Refer to Figure 13. At which aircraft position(s) would you receive omni indication V?

1—F only.
2—E, H, and C.
3—E and H.
4—B only.

4531. Refer to Figure 13. At which aircraft position(s) would you receive omni indication X?

1—A and C.
2—A and G.
3—C and G.
4—G only.

4532. Refer to Figure 13. At which aircraft position(s) would you receive omni indication U?

1—A and B.
2—A, B, and F.
3—B only.
4—F only.

4533. Refer to Figure 13. Which omni indication would you receive for aircraft H?

1—T.
2—U.
3—V.
4—W.

4534. Refer to Figure 13. Which omni indications would you receive for aircraft E and G?

1—T and X.
2—W and Z.
3—V and T.
4—V and X.

4535. While maintaining a magnetic heading of 060° and a true airspeed of 130 kts., the 150 radial of a VOR is crossed at 1137 and the 140 radial at 1145. The approximate time and distance to this station are

1—38 min. and 82 NM.
2—42 min. and 91 NM.
3—40 min. and 96 NM.
4—48 min. and 104 NM.

4536. While maintaining a magnetic heading of 180° and a true airspeed of 130 kts., the 270 radial of a VOR is crossed at 1037 and the 260 radial at 1042. The approximate time and distance to this station are

1—30 min. and 65 NM.
2—42 min. and 91 NM.
3—44 min. and 96 NM.
4—42 min. and 104 NM.

4537. Refer to Figure 14. What radial from the station does HSI indicator A show you to be crossing?

1—030.
2—040.
3—180.
4—220.

4538. Refer to Figure 14. Select the true statement regarding HSI indicator E.

1—The aircraft is inbound on the 240 radial.
2—The aircraft heading is 360°.
3—The aircraft will intercept the selected course at a 15° angle.
4—The aircraft is on a heading of 345°.

4539. Refer to Figure 14. Which HSI indicator shows a 210° magnetic bearing to the station?

1—A.
2—B.
3—C.
4—D.

4540. Refer to Figure 14. Which HSI indicator shows the heading marker to be on 345°?

1—C.
2—D.
3—E.
4—F.

4541. During flight with zero angle of attack, the pressure along the upper surface of the wing would be

1—less than atmospheric pressure.
2—equal to atmospheric pressure.
3—greater than atmospheric pressure.
4—greater than the pressure below the wing.

4542. As it applies to airfoils, which statement is in agreement with Bernoulli's Principle?

1—The speed of a fluid increases at points where the pressure of the fluid increases.
2—The pressure of a fluid decreases at points where the speed of the fluid increases.
3—The pressure of a fluid increases at points where the speed of the fluid increases.
4—The pressure of a fluid decreases at points where the speed of the fluid decreases.

4543. An airplane wing is designed to produce lift resulting from relatively

1—positive air pressure below and above the wing's surface.
2—negative air pressure below the wing's surface and positive air pressure above the wing's surface.
3—positive air pressure below the wing's surface and negative air pressure above the wing's surface.
4—negative air pressure below and above the wing's surface.

4544. Changes in the center of pressure of a wing affect the airplane's

1—aerodynamic balance and controllability.
2—center-of-gravity location.
3—lifting capacity.
4—lift/drag ratio.

4545. Lift produced by an airfoil is the net force developed perpendicular to the

1—Earth's surface.
2—relative wind.
3—chord.
4—longitudinal axis of the aircraft.

4546. When considering the forces acting upon an airplane in straight-and-level flight at constant airspeed, which statement is correct?

1—Drag always acts rearward parallel to relative wind and is less than thrust.
2—Thrust always acts forward parallel to the relative wind and is greater than drag.
3—Lift always acts perpendicular to the longitudinal axis of the wing and is greater than weight.
4—Weight always acts vertically toward the center of the Earth.

4547. The point on an airfoil through which lift acts is the

1—midpoint of the chord.
2—center of pressure.
3—center of rotation.
4—center of gravity.

4548. When the angle of attack of an asymmetrical airfoil is increased, the center of pressure will

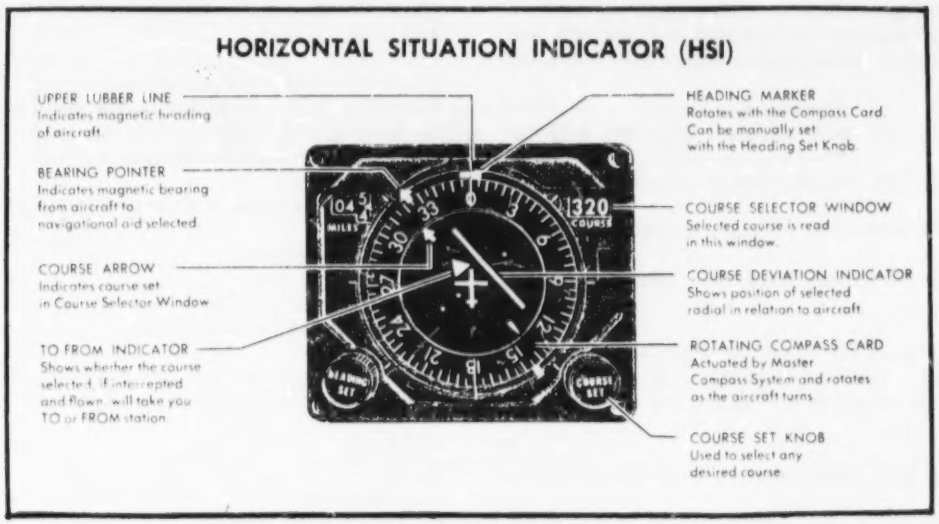
1—remain unaffected.
2—move forward.
3—move aft.
4—move erratically.

4549. Forward elevator control pressure is needed whenever power is added, because the

1—download on the tail surface increases, therefore, increasing the pitch-up tendency.
2—lift on the tail surface is decreased by the decreased downwash.
3—nose of the airplane is pulled upward due to the added thrust.
4—nose of the airplane raises due to the increased angle of attack and additional lift.

4550. In steady-state flight the sum of the opposing forces acting on an airplane is equal to

1—the total weight of the airplane.
2—the total weight of the airplane plus the total drag.
3—zero.
4—the thrust plus total lift.


HORIZONTAL SITUATION INDICATOR (HSI)
UPPER LUBBER LINE
Indicates magnetic heading of aircraft.
BEARING POINTER
Indicates magnetic bearing from aircraft to navigational aid selected.
COURSE ARROW
Indicates course set in Course Selector Window.
TO FROM INDICATOR
Shows whether the course selected, if intercepted and flown, will take you TO or FROM station.
HEADING MARKER
Rotates with the Compass Card. Can be manually set with the Heading Set Knob.
COURSE SELECTOR WINDOW
Selected course is read in this window.
COURSE DEVIATION INDICATOR
Shows position of selected radial in relation to aircraft.
ROTATING COMPASS CARD
Actuated by Master Compass System and rotates as the aircraft turns.
COURSE SET KNOB
Used to select any desired course.

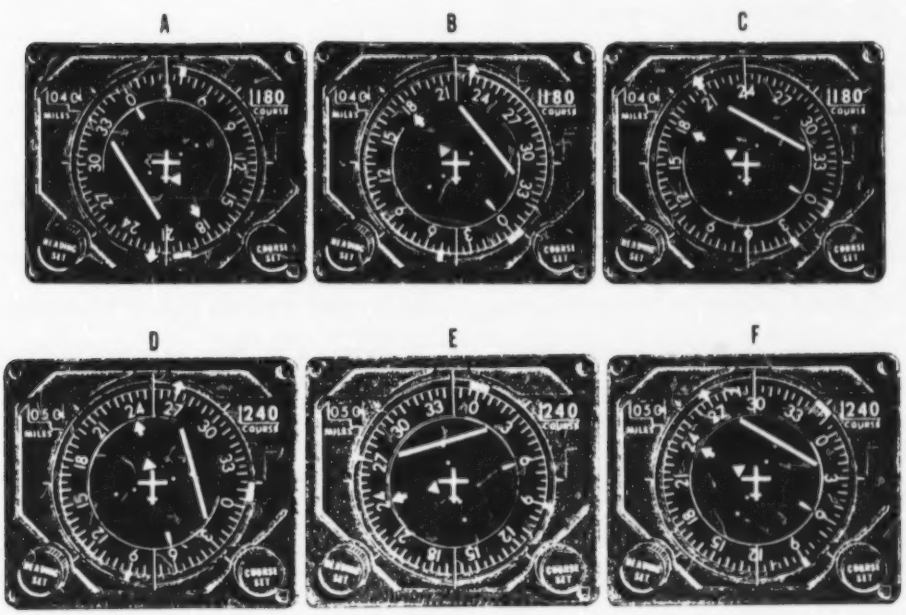


Figure 14

4551. Which statement describes the relationship of the forces acting on an airplane in a constant–power and constant–airspeed descent?

1—Thrust is equal to drag; weight is greater than lift.
2—Thrust is equal to drag; lift is equal to weight.
3—Thrust is greater than drag; weight is greater than lift.
4—Thrust is greater than drag; lift is equal to weight.

4552. Which statement is true regarding the forces acting on an aircraft in a steady–state climb?

1—The sum of all forward forces is less than the sum of all rearward forces.
2—The sum of all forward forces is greater than the sum of all rearward forces.
3—The sum of all upward forces is greater than the sum of all downward forces.
4—The sum of all upward forces is equal to the sum of all downward forces.

4553. Refer to Figure 15. While rolling into a right turn, if the inclinometer appears as illustrated in A, the HCL and CF vectors would be acting on the airplane as illustrated in

1—4, and more right rudder pressure is needed to center the ball.
2—2, and more right rudder pressure is needed to center the ball.
3—4, and more left rudder pressure is needed to center the ball.
4—2, and more left rudder pressure is needed to center the ball.

4554. Refer to Figure 15. While rolling into a right turn, if the inclinometer appears as illustrated in C, the HCL and CF vectors would be acting on the airplane as illustrated in

1—3, and less right rudder pressure is needed to center the ball.
2—5, and more right rudder pressure is needed to center the ball.
3—5, and less right rudder pressure is needed to center the ball.
4—3, and more right rudder pressure is needed to center the ball.

4555. Refer to Figure 15. While rolling out of a left turn, if the inclinometer appears as illustrated in A, the HCL and CF vectors would be acting on the airplane as illustrated in

1—2, and more right rudder pressure is needed to center the ball.
2—2, and more left rudder pressure is needed to center the ball.
3—4, and more left rudder pressure is needed to center the ball.
4—4, and more right rudder pressure is needed to center the ball.

4556. What is the rotation of an airplane about its lateral axis called, and how is it controlled?

1—Pitching, and is controlled with the elevator.
2—Yawing, and is controlled with the ailerons.
3—Rolling, and is controlled with the ailerons.
4—Yawing, and is controlled with the rudder.

4557. What is the rotation of an airplane about its longitudinal axis called and how is it controlled?

1—Yawing, and it is controlled with the rudder.
2—Yawing, and it is controlled with the ailerons.
3—Rolling, and it is controlled with the ailerons.
4—Pitching, and it is controlled with the elevator.

4558. Rotation about the vertical axis of an airplane is known as

1—yawing, and is controlled by the use of rudder.
2—rolling, and is controlled by the use of ailerons.
3—turning, and is controlled by the use of ailerons.
4—pitching, and is controlled by the use of elevators.

4559. The three axes of an airplane intersect at the

1—center of gravity.
2—center of pressure.
3—midpoint of the datum line.
4—midpoint of the mean chord.

4560. The angle between the chord line of an airfoil and the relative wind is known as the angle of

1—attack.
2—lift.
3—incidence.
4—longitudinal dihedral.

4561. The angle between the chord line of the wing and the longitudinal axis of the airplane is known as the angle of

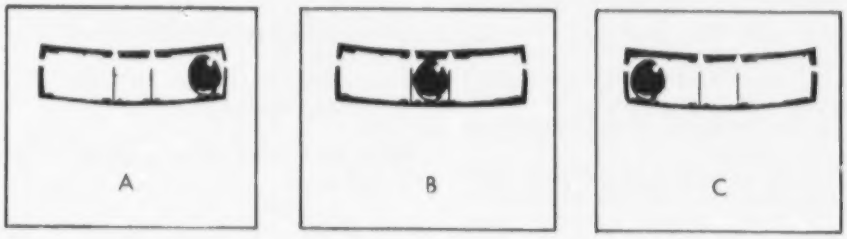
1—attack.
2—relative wind.
3—incidence.
4—dihedral.

4562. What changes in airplane control must be made to maintain altitude while the airspeed is being decreased?

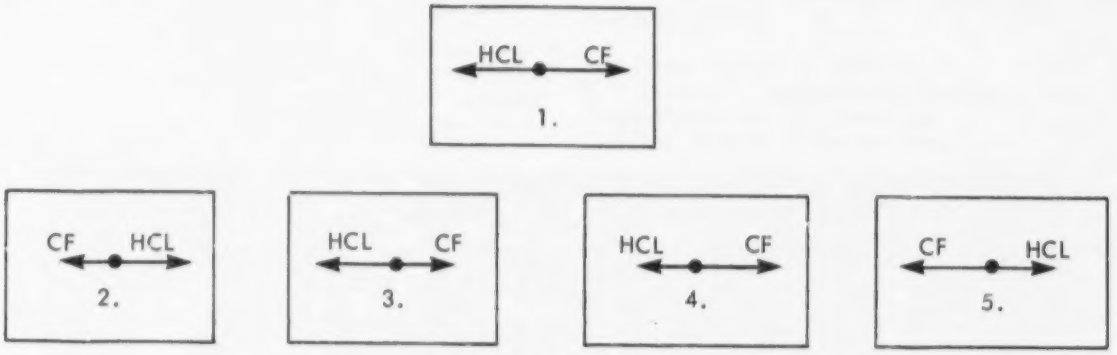
1—Increase the angle of attack to compensate for the decreasing lift.
2—Increase the angle of attack to produce more lift than drag.
3—Decrease the angle of attack to compensate for the increasing drag.
4—Maintain a constant angle of attack until the desired airspeed is reached, then increase the angle of attack.

4563. The angle of attack of a wing directly controls the

1—amount of airflow above and below the wing.
2—point at which the center of gravity is located.
3—distribution of positive and negative pressure acting on the wing.
4—angle of incidence of the wing.



INCLINOMETER



FORCE VECTORS

NOTE: HCL DENOTES HORIZONTAL COMPONENT OF LIFT.
CF DENOTES CENTRIFUGAL FORCE.
LENGTH OF ARROWS DENOTES MAGNITUDE OF FORCE.

Figure 15

4564. Refer to Figure 16. Which statement is true regarding airplane flight at L/D max?

1—Any angle of attack other than that for L/D max increases the lift/drag ratio.
2—Any angle of attack other than that for L/D max increases total drag for a given airplane's lift.
3—The angle of attack for L/D max is greater than that for maximum coefficient of lift.
4—Any angle of attack other than that for L/D max increases parasite drag.

4565. Refer to Figure 16. The L/D at 2° angle of attack is approximately the same as the L/D for

1—9.75° angle of attack.
2—10.5° angle of attack.
3—16.5° angle of attack.
4—19.0° angle of attack.

4566. If the airspeed of an airplane is doubled while the angle of attack remains the same, the drag will

1—remain the same.
2—double.
3—decrease as airspeed increases.
4—be four times greater.

4567. What effect will a decrease in air density have on lift and drag?

1—Lift will increase and drag will decrease.
2—Lift and drag will increase.
3—Lift and drag will decrease.
4—Lift will decrease and drag will increase.

4568. Refer to Figure 17. At an airspeed represented by point b, in steady flight, the pilot can expect to obtain the airplane's

1—minimum glide range in still air.
2—maximum glide range in still air.
3—maximum coefficient of lift.
4—minimum coefficient of lift.

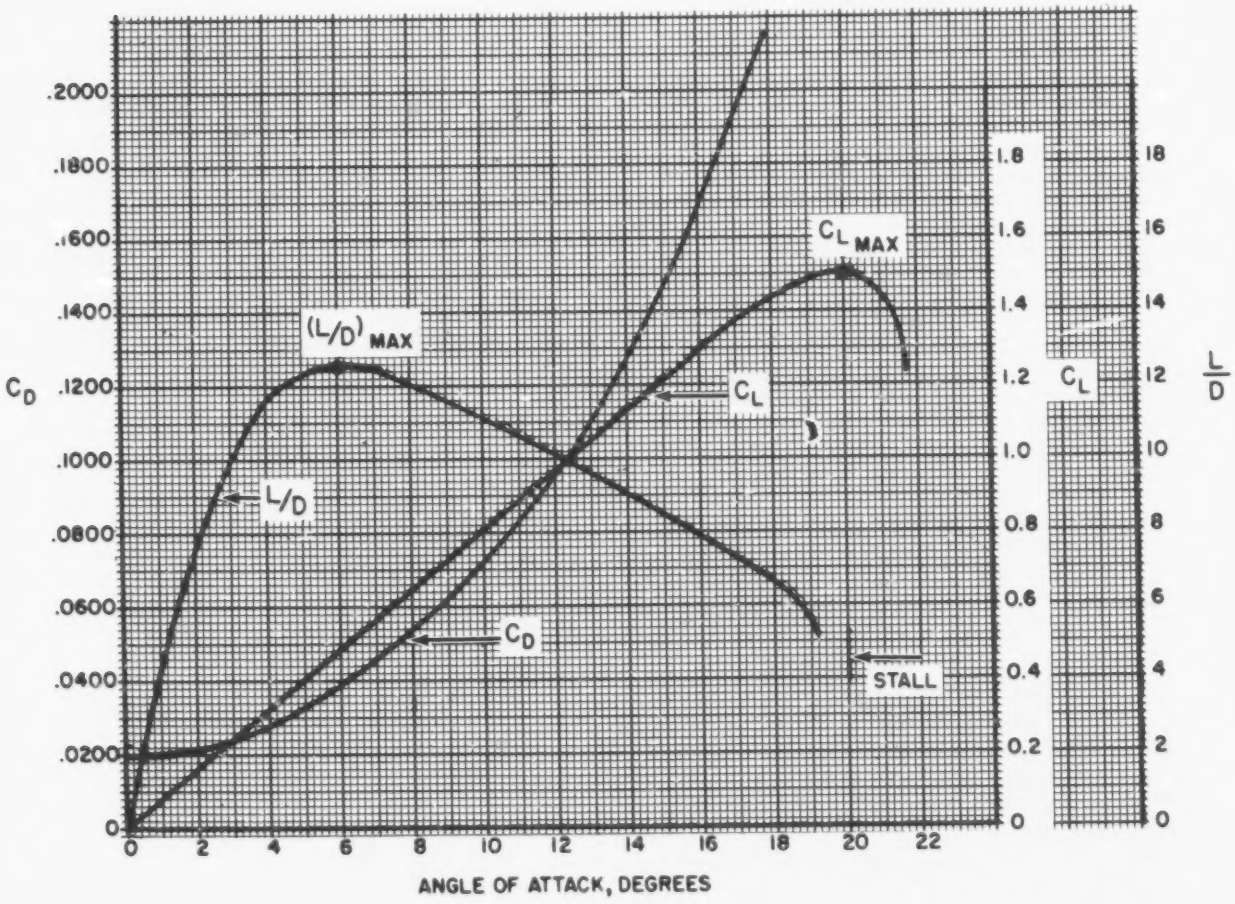


Figure 16

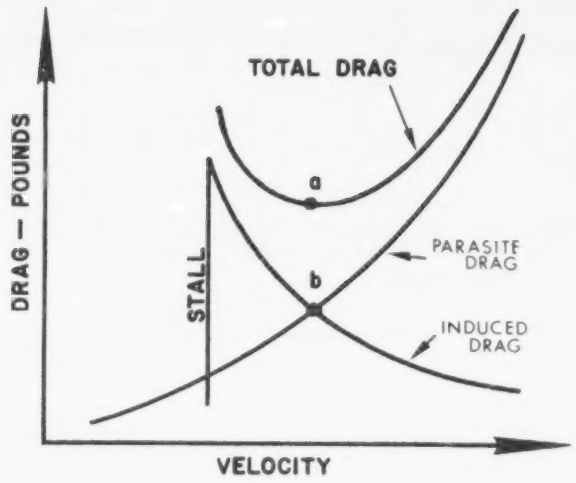


Figure 17

4569. Refer to Figure 17. At the airspeed represented by point a, in steady flight, the airplane will

1—be structurally damaged by full deflection of the controls.
2—have its maximum lift/drag ratio.
3—have its minimum lift/drag ratio.
4—be developing its maximum coefficient of lift.

4570. To produce the desired effect, trim tabs must be adjusted

1—in a direction to remain flush with the primary control surfaces they affect.
2—in the same direction as the primary control surfaces they affect.
3—in the opposite direction to the primary control surfaces they affect.
4—depending upon the design of the trim tab controls.

4571. The trimming devices on a particular airplane include trailing edge tabs on the rudder and a movable horizontal stabilizer. If the airplane is trimmed to a more nose down and nose left position, the stabilizer leading edge will move

1—down and the rudder tab will move to the right.
2—down and the rudder tab will move to the left.
3—up and the rudder tab will move to the right.
4—up and the rudder tab will move to the left.

4572. The primary purpose of high lift devices is to increase the

1—L/D max.
2—lift at slow speeds.
3—drag and reduce airspeed.
4—approach and landing speeds.

4573. The use of a slot in the leading edge of the wing enables the airplane to land at a slower speed because it

1—changes the camber of the wing.
2—increases the ground effect.
3—decelerates the upper surface boundary layer air.
4—delays the stall to a higher angle of attack.

4574. In comparing a straight wing and a sweptback wing of the same wing area and wing loading, the sweptback wing has the advantage of

1—lower stalling speed.
2—greater mean aerodynamic chord.
3—increased longitudinal stability.
4—higher critical Mach number.

4575. Which adverse stability characteristic is caused by sweepback?

1—Increase of dutchroll tendency.
2—Increase of longitudinal static stability.
3—Increase of Mach tuck tendency.
4—Increase of critical Mach number.

4576. A rectangular wing, as compared to other wing planforms, has a tendency to stall first at the

1—wing root providing adequate stall warning.
2—wingtip providing adequate stall warning.
3—wing root providing inadequate stall warning.
4—wingtip providing inadequate stall warning.

4577. The purpose of airplane wing dihedral angle is to

1—increase lateral stability.
2—increase longitudinal stability.
3—increase lift coefficient of the wing.
4—decrease drag coefficient of the wing.

4578. Aspect ratio of a wing is defined as the ratio of the

1—wingspan to the wing root.
2—square of the chord to the wingspan.
3—wingspan to the mean aerodynamic chord.
4—wing spar to the main compression rib.

4579. An airplane wing with a low aspect ratio has a

1—low wing loading and low stall speed.
2—high wing loading and low stall speed.
3—low wing loading and high stall speed.
4—high wing loading and high stall speed.

4580. At a constant velocity in airflow, a high aspect ratio wing will have (in comparison with a low aspect ratio wing)

1—decreased drag, especially at a high angle of attack.
2—increased drag, especially at a high angle of attack.
3—increased drag, especially at a low angle of attack.
4—decreased wing performance when in a climbing attitude.

AIRPLANE "A"	WING SPAN	48 FEET
	AVERAGE WING CHORD	5 FEET
AIRPLANE "B"	WING SPAN	30 FEET
	AVERAGE WING CHORD	8 FEET
AIRPLANE "C"	WING SPAN	40 FEET
	AVERAGE WING CHORD	5 FEET
AIRPLANE "D"	WING SPAN	36 FEET
	AVERAGE WING CHORD	6 FEET

Figure 18

4581. Refer to Figure 18. Which airplane has the highest aspect ratio?

1—A.
2—B.
3—C.
4—D.

4582. Refer to Figure 18. Which airplane has the lowest aspect ratio?

1—A.
2—B.
3—C.
4—D.

4583. Refer to Figure 18. Consider only aspect ratio (other factors remain constant). Which airplane will generate greatest lift?

1—A.
2—B.
3—C.
4—D.

4584. Refer to Figure 18. Consider only aspect ratio (other factors remain constant). Which airplane will generate greatest drag?

1—A.
2—B.
3—C.
4—D.

4585. If a load factor of 2.5 was imposed on an airplane that weighs 2,675 lb., the airload imposed on that airplane would be

1—2,675 lb.
2—4,012.5 lb.
3—5,350 lb.
4—6,687.5 lb.

4586. An airplane has a normal stalling speed of 62 MPH but is forced into an accelerated stall at twice that speed. What maximum load factor will result from this maneuver?

1—1 G.
2—2 G's.
3—3 G's.
4—4 G's.

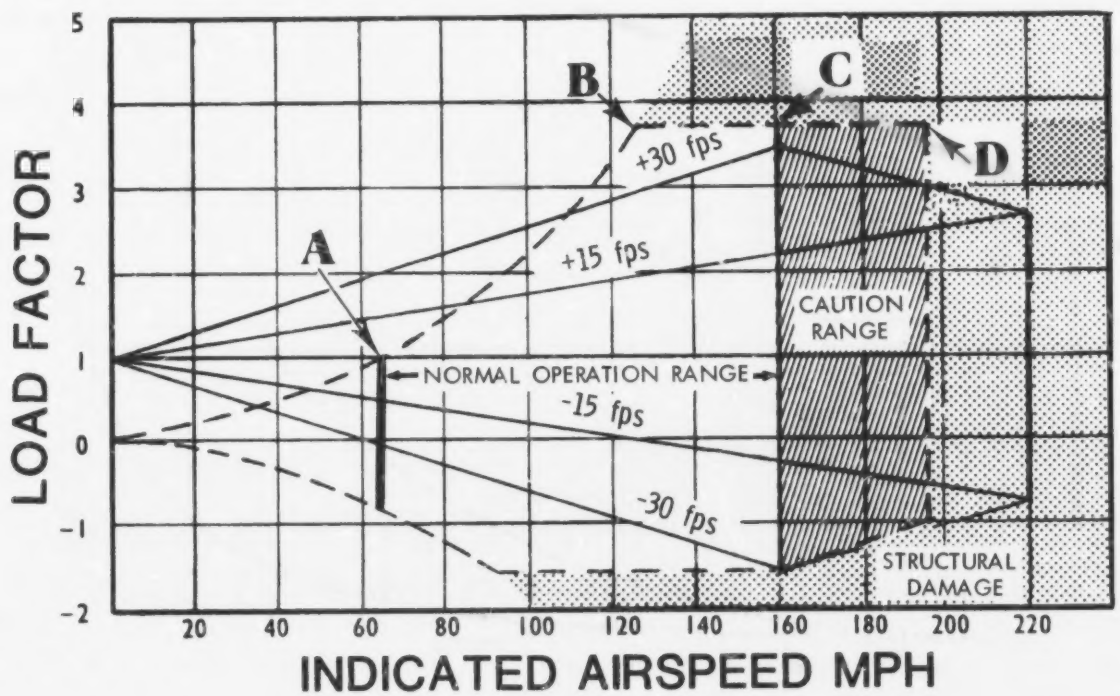


Figure 19

4587. During maneuvering flight such as turns or pullouts from dives, the increased load imposed on the wings is caused by

1—the airplane's speed.
2—centrifugal force.
3—gravitational force.
4—induced drag.

4588. Refer to Figure 19. A positive load factor of 4 at 140 MPH would cause the airplane to

1—climb at a steady rate.
2—be subjected to structural damage.
3—break apart.
4—stall.

4589. Refer to Figure 19. What load factor would be created if positive 30 FPS gusts were encountered at 130 MPH?

1—1.8.
2—2.0.
3—3.0.
4—3.8.

4590. Refer to Figure 19. The horizontal dashed line from point B to point D represents the

1—maximum structural cruise airspeed range.
2—positive limit load factor.
3—airspeed range for normal operations.
4—ultimate load factor.

4591. Refer to Figure 20. What increase in load factor would take place if the angle of bank were increased from 60° to 80°?

1—1 G.
2—2 G's.
3—3 G's.
4—4 G's.

4592. Refer to Figure 20. What is the stall speed of an airplane under a load factor of 4 if the unaccelerated stall speed is 70 kts.?

1—91 kts.
2—116 kts.
3—132 kts.
4—140 kts.

4593. Refer to Figure 20. If, during a steady turn with a 50° bank, a load factor of 1.5 were imposed on an airplane which has an unaccelerated stall speed of 60 kts., at what speed would the airplane first stall?

1—60 kts.
2—68 kts.
3—75 kts.
4—82 kts.

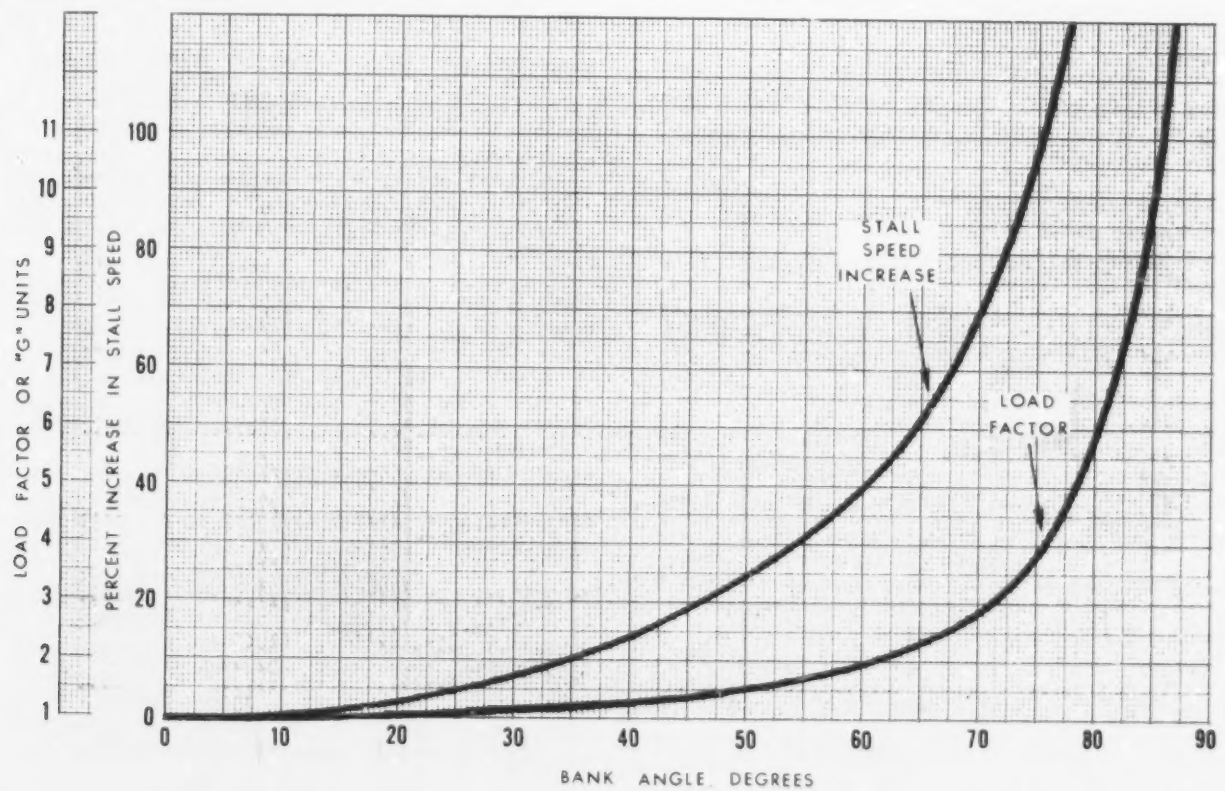


Figure 20

4594. The tendency of an airplane to develop forces which restore it to its original condition, when disturbed from a condition of steady flight, is known as

1—controllability.
2—maneuverability.
3—stability.
4—balance.

4595. The tendency of an airplane to develop forces that further remove the airplane from its original position, when disturbed from a condition of steady flight, is known as

1—dynamic instability.
2—neutral static stability.
3—static instability.
4—positive static stability.

4596. If the airplane's nose initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays

1—positive dynamic stability.
2—positive static stability.
3—negative dynamic stability.
4—neutral dynamic stability.

4597. If the airplane's nose initially tends to move farther from its orginal position after the elevator control is pressed forward and released, the airplane displays

1—negative static stability.
2—positive static stability.
3—negative dynamic stability.
4—neutral dynamic stability.

4598. If the airplane's nose remains in the new position after the elevator control is pressed forward and released, the airplane displays

1—negative static stability.
2—neutral dynamic stability.
3—positive static stability.
4—neutral static stability.

4599. If the airspeed increases and decreases during longitudinal phugoid oscillations, the airplane

1—can be easily controlled by the pilot.
2—can not be controlled by the pilot.
3—will display poor trimming qualities.
4—is constantly changing angle of attack making it difficult for the pilot to reduce the magnitude of the oscillations.

4600. Which of the following airplane characteristics contribute to spiral instability?

1—Strong static directional stability and strong dihedral effect.
2—Strong static directional stability and weak dihedral effect.
3—Weak static directional stability and weak dihedral effect.
4—Weak static directional stability and strong dihedral effect.

4601. To maintain level cruising flight in an airplane which is loaded with the CG at the forward limit, an additional download must be imposed on the horizontal stabilizer. This in turn produces

1—an additional load which the wing must support.
2—a lesser load that must be supported by the wing.
3—a decrease in drag and results in a faster airspeed.
4—a decrease in drag and reduces the stalling speed.

4602. Under which condition is a forward CG most critical?

1—On landing.
2—On takeoff.
3—During a spin.
4—When in an unusual attitude.

4603. What is characteristic of the indicated airspeed if the CG is at the most forward allowable position and constant power and altitude are maintained?

1—Indicated airspeed will be greater than it would be with the CG in the most rearward allowable position.
2—Indicated airspeed will be less than it would be with the CG in the most rearward allowable position.
3—There is no relationship between CG location and indicated airspeed.
4—Indicated airspeed will be less than it would be at the most rearward CG position, but not less than it would be with the CG midway between the forward and aft limits.

4604. As the center of gravity location is changed, recovery from stalls becomes progressively

1—less difficult as the CG moves rearward.
2—more difficult as the CG moves forward.
3—less difficult as the CG moves either forward or rearward.
4—more difficult as the CG moves rearward.

4605. What adverse effect does frost on the wings have on an airplane?

1—It changes the basic aerodynamic shape of the wing.
2—It disrupts the smooth flow of air over the wing.
3—It decreases the airplane's stall speed.
4—It increases the airplane's weight significantly.

4606. A fixed–pitch propeller can be efficient only at a given combination of

1—airspeed and altitude.
2—airspeed and RPM.
3—air density and altitude.
4—altitude and RPM.

4607. Which of the following statements is true regarding propeller efficiency?

1—Propeller efficiency is not affected by propeller slippage.
2—Propeller efficiency is the ratio of thrust horsepower to brake horsepower.
3—Propeller efficiency is the theoretical distance a propeller should advance in one revolution.
4—Propeller efficiency is the actual distance a propeller advances in one revolution.

4608. The reason for variations in geometric pitch (twisting) along a propeller blade is that it

1—permits a relatively constant angle of incidence along its length when in cruising flight.
2—prevents the portion of the blade near the hub to stall during cruising flight.
3—permits a relatively constant angle of attack along its length when in cruising flight.
4—prevents asymmetrical loading of the propeller during a climb.

4609. With regard to gyroscopic precession, when a force is applied at a point on the rim of a spinning disc the resultant force acts in which direction and at what point?

1—In the same direction as the applied force, at the point of the applied force.
2—In the opposite direction of the applied force, at the point of the applied force.
3—In the same direction as the applied force, 90° ahead in the plane of rotation.
4—In the opposite direction of the applied force, 90° ahead in the plane of rotation.

4610. The effect of torque is most noticeable during

1—maximum speed in level flight with maximum continuous power.
2—flight at a critically slow airspeed with full throttle.
3—maximum structural cruising speed.
4—gliding flight with a reduced throttle setting.

4611. The left turning tendency of an airplane caused by P–factor is the result of the

1—clockwise rotation of the engine and the propeller turning the airplane counterclockwise.
2—propeller blade descending on the right, producing more thrust than the ascending blade on the left.
3—gyroscopic forces applied to the rotating propeller blades acting 90° in advance of the point the force was applied.
4—spiral characteristics of the slipstream air being forced rearward by the rotating propeller.

4612. A propeller rotating clockwise as seen from the rear, creates a spiraling slipstream that tends to rotate the airplane to the

1—right around the vertical axis, and to the right around the longitudinal axis.
2—right around the vertical axis, and to the left around the longitudinal axis.
3—left around the vertical axis, and to the right around the longitudinal axis.
4—left around the vertical axis, and to the left around the longitudinal axis.

4613. Choose the true statement pertaining to a slip or skid in an airplane.

1—A skid occurs when too much rudder is applied in the direction opposite the turn.
2—A skid occurs when the rate of turn is too fast for the amount of bank being used.
3—In a right descending turn, if excessive right rudder is applied to compensate for the decreased torque effect, a slip will result.
4—In a left climbing turn, if insufficient right rudder is applied to compensate for the increased torque effect, a slip will result.

4614. During a level turn, increasing the airspeed while maintaining a constant load factor would result in

1—the same radius of turn.
2—a decrease in the radius of turn.
3—an increase in the radius of turn.
4—an increase in centrifugal force.

4615. An airplane in a steep–banked turn stalls at a higher airspeed than it does with the wings level because in the turn the

1—critical angle of attack is reached at a higher airspeed.
2—total lift has decreased.
3—effective thrust has decreased.
4—critical angle of attack has decreased.

4616. The angle of attack at which an airplane stalls

1—decreases with an increase in engine power.
2—remains constant regardless of gross weight.
3—increases with an increase in engine power.
4—varies with gross weight and density altitude.

4617. Which statement is true relating to the factors which produce stalls?

1—An accelerated stall will always produce a spin.
2—The stalling angle of attack is independent of the speed of airflow over the wings.
3—The stalling angle of attack depends upon the speed of the airflow over the wings.
4—The critical angle of attack is a function of the degree of bank.

4618. As altitude increases, the indicated airspeed at which a given airplane stalls in a particular configuration will

1—decrease as the true airspeed decreases.
2—decrease as the true airspeed increases.
3—remain the same as at low altitude.
4—increase because the air density becomes less.

4619. In all cases for an airplane to spin, it must first be

1—partially stalled with one wing low and the throttle closed.
2—placed in a steep diving spiral.
3—stalled.
4—placed in a steep nose–high pitch attitude.

4620. Which of the following is a result of ground effect?

1—An increase in the wing's downwash with no increase in angle of attack.
2—An increase in wingtip vortices at a given angle of attack.
3—An increase in lift with no increase in angle of attack.
4—An increase in induced drag with no change in angle of attack.

4621. What is a common result of ground effect during a takeoff or a landing?

1—Stalling prematurely during a landing.
2—Lifting off at a higher–than–normal airspeed.
3—Accelerating at a faster–than–normal rate during takeoff.
4—Floating during a landing.

4622. An airplane is usually affected by ground effect at what height above the surface?

1—Between 100 and 200 ft. above the surface in calm wind conditions.
2—Less than half the airplane's wingspan above the surface.
3—Twice the airplane's wingspan above the surface.
4—Three to four times the airplane's wingspan.

4623. If the same angle of attack is maintained in ground effect as when out of ground effect, lift will

1—increase, and induced drag will decrease.
2—decrease, and parasite drag will increase.
3—increase, and induced drag will increase.
4—decrease, and parasite drag will decrease.

4624. In a multiengine airplane with engines which rotate clockwise, the critical engine is the

1—left engine, because the right engine center of thrust is further away from the centerline of the fuselage.
2—left engine, because the right engine center of thrust is closer to the centerline of the fuselage.
3—right engine, because the left engine center of thrust is further away from the centerline of the fuselage.
4—right engine, because the left engine center of thrust is closer to the centerline of the fuselage.

4625. Mach number is commonly defined as the

1—ratio of equivalent airspeed to the speed of sound.
2—speed of sound under conditions of standard pressure and temperature.
3—calibrated airspeed corrected for position and instrument error.
4—ratio of true airspeed to the speed of sound.

4626. What is critical Mach number?

1—Highest speed possible without supersonic airflow over any part of the wing.
2—Mach .78 through Mach .86 for all high–speed aircraft.
3—Speed at which the aircraft starts to buffet or tuck.
4—Speed where the airflow over the wing is completely supersonic.

4627. Why does a tailwheel airplane have a tendency to weathervane or turn into the wind during ground operations?

1—The engine is higher than the tail, preventing propwash from exerting a force on the vertical fin and rudder.
2—More side surface is exposed to the wind aft of the main wheels than forward of the main wheels.
3—The tailwheel is nonsteerable, so only the rudder can be used for directional control.
4—The CG is located behind the main wheels, thereby creating a greater turning moment.

4628. Why is the tendency to groundloop greater in tailwheel airplanes than in nosewheel airplanes? Primarily because in tailwheel airplanes the

1—pilot's forward vision is obscured when in the three–point attitude, whereas in nosewheel airplanes the pilot has a clear view ahead.
2—CG is aft of the main wheels, whereas it is forward of the main wheels in nosewheel airplanes.
3—CG is forward of the main wheels, where it is aft of the main wheels in nosewheel airplanes.
4—control of direction is accomplished by use of the rudder only, whereas all nosewheel airplanes have nosewheel steering.

4629. When entering a turn, the primary function of the rudder is to

1—control yawing about the vertical axis.
2—cause the aircraft to turn.
3—prevent the aircraft from rolling about the longitudinal axis.
4—allow the aircraft to pitch about its lateral axis.

4630. What is the most important function of a rudder during coordinated flight?

1—The rudder prevents skids.
2—The rudder turns the airplane.
3—Properly applied, the rudder helps to overcome the effects of torque and adverse yaw.
4—Applying rudder overcomes the asymmetrical thrust of the propeller as a turn is initiated.

4631. What is the primary advantage of a constant-speed propeller?

1—To obtain and maintain a selected pitch angle of the blades regardless of the flight situation or power setting.
2—To obtain a pitch setting that is suitable for each flight situation and power setting.
3—To maintain a specific engine speed.
4—To control the power output developed by the engine.

4632. To absorb maximum engine power and to develop maximum thrust, a constant-speed propeller should be adjusted to a blade angle which will produce a

1—small angle of attack and low RPM.
2—small angle of attack and high RPM.
3—large angle of attack and high RPM.
4—large angle of attack and low RPM.

4633. One of the main functions of flaps during the approach and landing is to

1—decrease the angle of descent without increasing the airspeed.
2—permit a touchdown at a higher indicated airspeed.
3—increase the angle of descent without increasing airspeed.
4—decrease lift, thus enabling a steeper-than-normal approach to be made.

4634. Which statement is true concerning the use of flaps during approach and landing?

1—Flaps decrease lift which increases the stall speed.
2—Flaps provide an increase in lift.
3—A steeper-than-normal approach is necessary due to the increase in stall speed.
4—The airspeed does not deteriorate as rapidly when the landing flare is started.

4635. Float-type carburetor systems, compared to fuel injection systems, are generally considered to be

1—equally susceptible to icing as a fuel injection unit.
2—susceptible to icing only when visible moisture is present.
3—more susceptible to icing than a fuel injection unit.
4—less susceptible to icing than a fuel injection unit.

4636. The operating principle of float-type carburetors is based on the

1—automatic metering of air at the venturi as the aircraft gains altitude.
2—difference in air pressure at the venturi throat and the air inlet.
3—increase in air velocity in the throat of a venturi causing an increase in air pressure.
4—measurement of the fuel flow into the induction system.

4637. An increase in carburetor air temperature while operating at the same altitude with the same RPM and manifold pressure, will produce

1—the same engine horsepower.
2—more engine horsepower.
3—less engine horsepower.
4—variable or fluctuating engine horsepower.

4638. One advantage of fuel injection systems over carburetor systems is

1—less difficulty with hot weather vapor locks during ground operations.
2—better fuel distribution to the cylinders.
3—easier hot-engine starting.
4—easier in-flight restarting.

4639. The presence of carburetor ice, in an airplane equipped with a fixed-pitch propeller can be verified by applying carburetor heat and noting

1—an increase in RPM and then a gradual decrease in RPM.
2—a decrease in RPM and then a constant RPM indication.
3—an immediate increase in RPM with no further change in RPM.
4—a decrease in RPM and then a gradual increase in RPM.

4640. The first indication of carburetor icing in airplanes equipped with constant-speed propellers would most likely be a

1—rough running engine followed by an increase in manifold pressure.
2—decrease in manifold pressure.
3—decrease in RPM.
4—rough running engine followed by loss of RPM.

4641. When operating a supercharged engine, the use of carburetor heat should be regulated by reference to the

1—degree of roughness at which the engine is operating.
2—carburetor air or mixture temperature gauge.
3—manifold pressure or RPM indicator.
4—cylinder air temperature gauge.

4642. Applying carburetor heat will

1—result in more air going through the carburetor.
2—not affect the mixture.
3—enrich the fuel/air mixture.
4—lean the fuel/air mixture.

4643. The low temperature that causes carburetor ice in an engine equipped with a float-type carburetor is normally the result of the

1—compression of air at the carburetor venturi.
2—low volatility of the fuel.
3—vaporization of fuel and expansion of air in the carburetor.
4—freezing temperature of the air entering the carburetor.

4644. Concerning carburetor icing, which statement is true?

1—Carburetor icing would most likely form when the air temperature is between 20° F and 70° F with visible moisture or high humidity.
2—The carburetor heater is a deicing device that heats the air after it enters the carburetor.
3—The first indication of carburetor icing in an airplane equipped with a fixed-pitch propeller is an increase in RPM, followed by a decrease in RPM.
4—Carburetor icing will form in a carburetor whenever the temperature is below freezing 32° F (0° C).

4645. In addition to an added safety factor, dual ignition systems also provide

1—better combustion.
2—uniform engine heating.
3—shorter engine warmup periods.
4—less engine vibrations.

4646. If the ground wire between the magneto and the ignition switch becomes disconnected, the most noticeable result will be that the engine

1—will not operate on the left magneto.
2—cannot be started with the switch in the ON position.
3—cannot be shut down by turning the switch to the OFF position.
4—will not operate on the right magneto.

4647. Aircraft magnetos depend upon which of the following for electrical energy?

1—Batteries.
2—Generators.
3—Alternators.
4—Self-contained magnets.

4648. Excessively high engine temperatures, either in the air or on the ground, will

1—cause damage to heat-conducting hoses and warping of the cylinder cooling fins.
2—cause loss of power, excessive oil consumption, and possible permanent internal engine damage.
3—not appreciably affect an aircraft engine in either environment.
4—increase fuel consumption and may increase power due to the increased heat.

4649. If the engine oil temperature and cylinder head temperature gauges have exceeded their normal operating range, you may have been

1—operating with the mixture set too rich.
2—operating with higher-than-normal oil pressure.
3—using fuel that has a higher-than-specified fuel rating.
4—operating with too much power and with the mixture set too lean.

4650. Prior to starting the engine the manifold pressure gauge usually indicates approximately 29" Hg. This is because the

1—pointer on the gauge is stuck at the full-power indication.
2—throttle is in the full-open position.
3—throttle is closed, trapping a high air pressure in the manifold.
4—pressure within the manifold is the same as atmospheric pressure.

4651. The power combination that is most likely to result in excessive cylinder pressures is a relatively

1—low manifold pressure with a high RPM.
2—high manifold pressure with a low RPM.
3—low manifold pressure with a low RPM.
4—high manifold pressure with a high RPM.

4652. Completely filling the fuel tanks after the last flight of the day prevents fuel contamination by eliminating the airspace so that

1—rust or corrosive scale cannot form in the tanks.
2—condensation of moist air cannot occur within the tanks.
3—development of micro-organisms is prevented by the fuel.
4—rain, snow, or other moisture cannot accumulate in the tanks.

4653. To properly purge water from the fuel system of an airplane equipped with fuel tank sumps and a fuel strainer quick drain, it is necessary to drain fuel from the

1—lowest point in the fuel system only.
2—fuel strainer drain and the fuel tank sumps.
3—fuel tank sump drains only.
4—fuel strainer drain only.

4654. The amount of water absorbed in aviation fuels will

1—remain the same regardless of temperature changes.
2—decrease as the temperature of the fuel increases.
3—increase as the temperature of the fuel increases.
4—increase as the temperature of the fuel decreases.

4655. Detonation occurs in a reciprocating aircraft engine when

1—the spark plugs are fouled or shorted out or the wiring is defective.
2—hot spots in the combustion chamber ignite the fuel/air mixture in advance of normal ignition.
3—there is too rich a fuel/air mixture.
4—the unburned charge in the cylinders explodes instead of burning normally.

4656. Detonation in an aircraft engine is most likely to occur whenever

1—the engine is operated under conditions which cause the fuel mixture to burn instantaneously.
2—the fuel/air ratio is such that the mixture burns extremely slow.
3—one spark plug misfires under high compression.
4—the fuel being used is of a higher grade than recommended by the engine manufacturer.

4657. If the grade of fuel used in an aircraft engine is lower than specified for the engine, it will most likely cause

1—a mixture of fuel and air that is not uniform in all cylinders.
2—lower cylinder head temperatures.
3—an increase in power which could overstress internal engine components.
4—detonation.

4658. Unless the engine manufacturer has recommended the use of low-lead gasoline, the use of this gasoline

1—should be avoided because of possible excessive engine wear.
2—is permissible and encouraged as a means to decrease air pollution.
3—should be limited because of its high-power output.
4—is permissible only if the grade of fuel is the same as that recommended.

4659. When is vapor lock most likely to occur in an airplane's fuel system?

1—During cold, damp days.
2—During ground operations on hot days.
3—When the engine is operated at high-power settings.
4—When flying at very high density altitudes.

4660. The practice of running a fuel tank dry before switching tanks is considered unwise because

1—the engine-driven fuel pump or electric fuel boost pump may draw air into the fuel system and cause vapor lock.
2—the engine-driven fuel pump is lubricated by fuel and operating on a dry tank may cause pump failure.
3—any foreign matter in the tank will be pumped into the fuel system.
4—the fuel pump is located above the bottom portion of the fuel tank.

4661. With regard to the use of aviation gasoline, which statement is true?

1—Use of a higher-than-specified grade of fuel usually results in lower-than-normal cylinder head temperatures.
2—Use of the next higher-than-specified grade of fuel is permissible if the specified grade of fuel is not available.
3—Use of the next lower-than-specified grade of fuel is permissible and it is usually not harmful to the engine.
4—Use of a lower-than-specified grade of fuel may result in a reduced power output but is usually less harmful than higher rated fuel.

4662. Fuel/air ratio is the ratio between the

1—volume of fuel and volume of air entering the cylinder.
2—volume of fuel and volume of air entering the carburetor.
3—weight of fuel and weight of air entering the cylinder.
4—weight of fuel and weight of air entering the carburetor.

4663. Proper mixture control and better economy in the operation of a fuel-injected engine can be achieved best by use of

1—a fuel-flow gauge.
2—an exhaust gas temperature indicator.
3—the oil pressure indicator.
4—the recommended manifold and RPM setting for a particular altitude.

4664. The main purpose of the mixture control is to

1—adjust the fuel flow to obtain the proper air/fuel ratio.
2—decrease the air supplied to the engine.
3—increase the oxygen supplied to the engine.
4—decrease oxygen supplied to the engine.

4665. When the pilot leans the mixture control, which of the following is being accomplished?

1—The volume of air entering the carburetor is being reduced.
2—The amount of fuel entering the combustion chamber is being increased.
3—The volume of air entering the carburetor is being increased.
4—The amount of fuel entering the combustion chamber is being reduced.

4666. Which of these will occur if no leaning is made with the mixture control as the flight altitude increases?

1—The volume of air entering the carburetor remains constant and the amount of fuel decreases.
2—The volume of air entering the carburetor decreases and the amount of fuel decreases.
3—The density of air entering the carburetor decreases and the amount of fuel remains constant.
4—The density of air entering the carburetor decreases and the amount of fuel increases.

4667. Which statement is true regarding fouling of the spark plugs of an aircraft engine?

1—Excessive heat in the combustion chamber of a cylinder causes oil to form on the center electrode of a spark plug and this fouls the plug.
2—Spark plug fouling results from operating with an excessively rich mixture.
3—Permitting the engine to idle for a long period of time on the ground is the best way to clear fouled spark plugs.
4—Carbon fouling of the spark plugs is caused primarily by operating an engine at excessively high cylinder head temperatures.

4668. Which of these is the main reason that fuel tank vents must be open?

1—To allow proper air pressure within the tanks for maintaining a steady fuel flow.
2—To allow fuel fumes to escape from the tanks, thus eliminating the possibility of the tanks exploding.
3—To allow excess fuel to drain overboard when heat expands the volume of fuel within the tanks.
4—To allow air to enter and prevent moisture from condensing and contaminating the fuel within the tanks.

4669. Which instrument would be affected by low pressure as indicated on the suction gauge?

1—Vertical-velocity indicator.
2—Airspeed indicator.
3—Pressure altimeter.
4—Heading indicator.

4670. In the Northern Hemisphere, a magnetic compass will normally indicate a turn toward the north if

1—a right turn is entered from an east heading.
2—a left turn is entered from a west heading.
3—an aircraft is decelerated while on an east or west heading.
4—an aircraft is accelerated while on an east or west heading.

4671. In the Northern Hemisphere, if an airplane is accelerated or decelerated, the magnetic compass will normally indicate

1—a turn momentarily, with changes in airspeed on any heading.
2—correctly when on a north or south heading while either accelerating or decelerating.
3—a turn toward the south while accelerating on a west heading.
4—a turn toward the north while decelerating on an east heading.

4672. Deviation error of the magnetic compass is caused by

1—certain metals and electrical systems within the airplane.
2—the difference in location of true north and magnetic north.
3—acceleration and deceleration.
4—northerly turning error.

4673. In the Northern Hemisphere, which of the following would be correct about starting the rollout from a turn using a magnetic compass?

1—Start the rollout before the compass indication reaches south by approximately 30° plus the pilot's normal lead.
2—Start the rollout before the compass indication reaches south by a number of degrees approximately equal to the latitude over which the turn is made plus the pilot's normal lead.
3—Start the rollout before the compass indication reaches south by a number of degrees approximately equal to the magnetic variation of the area over which the turn is made plus the pilot's normal lead.
4—Start the rollout after the compass indication passes south by a number of degrees approximately equal to the latitude minus the normal rollout lead.

4674. What should be the indication on the magnetic compass as you roll into a standard rate turn to the right from a south heading in the Northern Hemisphere?

1—The compass will indicate a turn to the right, but at a faster rate than is actually occurring.
2—The compass will initially indicate a turn to the left.
3—The compass will remain on south for a short time, then gradually catch up to the magnetic heading of the airplane.
4—The compass will indicate the approximate correct magnetic heading if the roll into the turn is smooth.

4675. What causes the northerly turning error in a magnetic compass?

1—Oversensitivity when nearer one of the magnetic poles.
2—Coriolis force at the mid-latitudes.
3—Centrifugal force acting on the compass card.
4—The magnetic dip characteristic.

4676. What precautions should be used with respect to oxygen systems?

1—Do not use grease covered hands, rags, or tools near oxygen equipment.
2—Assure that medical oxygen has been used to replenish oxygen containers.
3—An approved flame dispenser with shield should be used in checking the oxygen system for leaks.
4—Prohibit smoking while in an aircraft equipped with an oxygen system.

4677. What airspeed indicator marking identifies the maximum structural cruising speed of the airplane?

1—The upper limit of the white arc.
2—The upper limit of the green arc.
3—The upper limit of the yellow arc.
4—The red radial line.

4678. What does the lower limit of the white arc on an airspeed indicator represent?

1—Power-off stall speed; gear and flaps extended.
2—Power-off stall speed; gear and flaps retracted.
3—Minimum controllable airspeed with flaps extended.
4—Minimum controllable speed during a power approach in landing configuration.

4679. What does the lower limit of the green arc on an airspeed indicator represent?

1—Power-off stall speed; gear and flaps extended.
2—Power-off stall speed; gear and flaps retracted.
3—Minimum controllable airspeed with flaps extended.
4—Minimum controllable airspeed; gear and flaps retracted.

4680. What is the significance of the blue radial line on the airspeed indicator of a light twin-engine airplane and when is it to be used?

1—It indicates the speed which will provide the maximum altitude gain in a given time when one engine is inoperative and should be used for climb and final approach during engine-out operations.
2—It indicates the speed which will provide the greatest height for a given distance of forward travel when one engine is inoperative and should be used for all climbs during engine-out operations.
3—It indicates the minimum speed at which the airplane is controllable when the critical engine is suddenly made inoperative and should be used at all altitudes when an engine is inoperative.
4—It indicates the minimum safe single-engine speed and should be used during both normal and engine-out operations.

4681. What is an important airspeed limitation that is not color coded on airspeed indicators?

1—Never-exceed speed.
2—Maximum structural cruising speed.
3—Maneuvering speed.
4—Maximum flaps-extended speed.

4682. Pitot static system errors are generally the greatest in which range of airspeed?

1—Maneuvering speed.
2—High airspeed.
3—Low airspeed.
4—Cruising airspeed.

4683. If the static pressure tubes are broken inside a pressurized cabin during a high-altitude flight, the altimeter would probably indicate

1—higher than actual flight altitude.
2—sea level.
3—a fluctuating altitude.
4—lower than actual flight altitude.

4684. What is calibrated airspeed?

1—Indicated airspeed corrected for instrument and installation error.
2—Indicated airspeed corrected for air temperature.
3—Indicated airspeed corrected for pressure altitude.
4—Indicated airspeed corrected for density altitude.

4685. Concerning the advantages of an aircraft generator or alternator, select the true statement.

1—An alternator provides more electrical power at lower engine RPM than a generator.
2—A generator charges the battery during low engine RPM; therefore, the battery has less chance to become fully discharged, as often occurs with an alternator.
3—An alternator provides electrical current and eliminates the need for an aircraft to be equipped with a battery.
4—A generator always provides more electrical current than an alternator.

4686. An electrical system failure (battery and alternator) occurs during flight. In this situation, you would

1—probably experience failure of the engine ignition system, fuel gauges, aircraft lighting system, and avionics equipment.
2—probably experience engine failure due to the loss of the engine-driven fuel pump and also experience failure of the radio equipment, lights, and all instruments that require AC current.
3—experience avionics equipment failure.
4—experience high cylinder head temperature and low oil pressure indications.

4687. The best procedure to use when attempting to start an overprimed engine is to

1—follow the manufacturer's instructions.
2—handcrank the engine with the throttle open and the aircraft brakes set.
3—continue to use the starter until the engine fires.
4—boost the battery with an auxiliary power unit.

4688. When taxiing with strong quartering tailwinds, which of the following aileron positions should be used?

1—Aileron parallel to the ground on the side from which the wind is blowing.
2—Neutral (streamlined position).
3—Aileron up on the side from which the wind is blowing.
4—Aileron down on the side from which the wind is blowing.

4689. Which of the following aileron positions should you generally use when taxiing in strong quartering headwinds?

1—Aileron up on the side from which the wind is blowing.
2—Aileron down on the side from which the wind is blowing.
3—Neutral.
4—Aileron parallel to the ground on the side from which the wind is blowing.

4690. Name the four flight fundamentals involved in maneuvering an aircraft?

1—Aircraft power, pitch, bank, and trim.
2—Straight-and-level flight, turns, climbs, and descents.
3—Takeoffs, slow flight, fast flight, and stalls.
4—Starting, taxiing, takeoff, and landing.

4691. When operating an airplane with a constant-speed propeller, which procedure places the least stress on cylinder components?

1—Whether power settings are being increased or decreased, RPM is adjusted before manifold pressure.
2—When power settings are being increased, increase manifold pressure before RPM.
3—When power settings are being decreased, reduce manifold pressure before RPM.
4—When power settings are being decreased, reduce RPM before manifold pressure.

4692. Flight operations approaching maximum speeds, such as V_{NE}, should be avoided because

1—the stalling speed is increased to the point that maneuvers cannot be performed without resulting in a stall.
2—control effectiveness is so greatly impaired that it renders the airplane uncontrollable.
3—of the possibility of inducing flutter or exceeding the design load factors.
4—excessive induced drag will cause structural failures.

4693. Whenever climbing or descending through an inversion or wind shear zone, the pilot should be alert for which of the following changes in airplane performance?

1—A sudden loss of airspeed.
2—A fast rate of climb and a slow rate of descent.
3—A sudden surge of thrust.
4—A sudden decrease in power.

4694. During departure when low level wind shifts to a tailwind or rapidly decreasing headwind, aircraft performance will

1—initially increase, then decrease.
2—remain unchanged.
3—decrease.
4—increase.

4695. Which statement is true relating to the effect of low level wind shear on airplane performance?

1—A tailwind which shifts to a headwind causes an initial increase in airspeed.
2—A tailwind which shifts to a headwind causes the airplane to pitch down.
3—A headwind which shifts to a tailwind causes an inital increase in airspeed.
4—A headwind which shifts to a tailwind causes the airplane to pitch up.

4696. Which statement is true relating to the effect of low level wind shear on airplane performance?

1—A tailwind which shifts to a headwind causes an initial decrease in airspeed.
2—A tailwind which shifts to a headwind causes the airplane to pitch down.
3—A headwind which shifts to a tailwind causes an initial increase in airspeed.
4—A headwind which shifts to a tailwind causes the airplane to pitch down.

4697. If severe turbulence is encountered, the airplane's airspeed should be reduced to

1—maneuvering speed.
2—the minimum steady flight speed in the landing configuration.
3—normal operation speed.
4—maximum structural cruising speed.

4698. Which is the best technique for minimizing the wing load factor when flying in severe turbulence?

1—Control altitude with power, airspeed with elevator, and accept variations of bank.
2—Control airspeed with power, maintain wings level, and accept variations of altitude.
3—Set power and trim to obtain an airspeed at or below maneuvering speed, maintain wings level, and accept variations of airspeed and altitude.
4—Control airspeed as closely as possible with elevator and power, and accept variations of bank and altitude.

4699. During preflight in cold weather, crankcase breather lines should receive special attention because they are susceptible to being clogged by

1—moisture from the outside air which has frozen.
2—congealed oil from the crankcase.
3—ice in the breather line.
4—sediment in the crankcase.

4700. Which statement is true regarding preheating an airplane during cold weather operations?

1—The cockpit as well as the engine should be preheated.
2—The possibility of fire is rare during preheating.
3—The cockpit area should not be preheated with portable heaters.
4—Hot air should be blown directly at the engine through the air intakes.

4701. Which statement is true regarding airplane engine operation during cold weather?

1—Preheating an engine should be done only in an emergency.
2—Overpriming the engine could result in poor compression and hard starting.
3—Engine parts expand, making it difficult to crank the engine.
4—Prolonged idling causes the spark plug electrodes to become saturated with congealed oil and results in shorting out the spark plugs.

4702. While operating in the traffic pattern of a controlled airport, pilots may adjust flight to achieve proper spacing without ATC approval by

1—executing shallow S turns.
2—climbing or descending at the pilot's discretion.
3—executing 180° turns with shallow banks.
4—executing 360° turns.

4703. When operating a light twin-engine airplane at V_{MC}, the pilot should expect performance to be sufficient to maintain

1—heading.
2—heading and altitude.
3—heading, altitude, and be able to climb at 50 ft./min.
4—altitude.

4704. For an airplane with unsupercharged reciprocating engines, V_{MC}

1—increases with altitude.
2—decreases with altitude.
3—is not affected by altitude.
4—increases or decreases directly with temperature changes.

4705. Which of the following statements is true regarding the operation of a twin-engine airplane with one engine inoperative?

1—Banking toward the operating engine increases V_{MC}.
2—Banking toward the inoperative engine increases V_{MC}.
3—V_{MC} is a designed performance factor which must be proven during type certification and will not change as long as the ball is centered with appropriate rudder pressure.
4—Loss of directional control is not likely to occur as long as adequate rudder pressure is applied to keep the ball centered.

4706. Which condition causes V_{MC} to be the highest?

1—CG is at the most forward allowable position.
2—CG is at the most rearward allowable position.
3—Gross weight is at the maximum allowable value.
4—Outboard fuel tanks are full and inboard fuel tanks are empty.

4707. Pilots are encouraged to turn on the aircraft rotating beacon

1—just prior to takeoff.
2—just prior to taxi.
3—any time the engines are in operation.
4—only when the visibility is less than 5 mi.

4708. Which of the following procedures would minimize the possibility of gear up landings?

1—Requesting the control tower to verify that the landing gear is down.
2—Committing prelanding procedures to memory.
3—Checking for a gear horn sound by closing the throttle while on final approach.
4—Completing a prelanding checklist.

4709. If absolutely necessary to hand prop an engine, which of the following is adequate to prevent the airplane from moving forward when the engine starts?

1—Have the passenger hold the brakes ON while operating the throttle.
2—Have a qualified person operate the controls and brakes, or chock the wheels and tie the tail down.
3—Set the throttle to the START position and lock the parking brake ON.
4—Head the airplane into the wind, then set the engine controls to a low-power position.

4710. The most effective technique to use for detecting other aircraft at night is to

1—turn the head and sweep the eyes rapidly over the entire visible region.
2—avoid staring directly at the point where another aircraft is suspected to be flying.
3—avoid scanning the region below the horizon so as to avoid the effect of ground lights on the eyes.
4—stare directly at the point where another aircraft is suspected to be flying.

4711. Hazardous vortex turbulence that might be encountered behind large aircraft is created only when that aircraft is

1—developing lift.
2—heavily loaded.
3—operating at high airspeeds.
4—using high-power settings.

4712. Wingtip vortices which trail behind airplanes in flight are caused by the

1—pressure differential existing between the upper and lower surfaces of the wings.
2—axial flow or jetwash from turbine-driven airplanes.
3—propwash, or jetwash, depending on the type and speed of the airplane.
4—slipstream or propwash of propeller-driven airplanes.

4713. How does the wake turbulence vortex circulate around each wingtip?

1—Inward, upward, and around each tip.
2—Clockwise as viewed from behind.
3—Inward, upward, and counterclockwise.
4—Outward, upward, and around each tip.

4714. Wingtip vortices created by large aircraft tend to

1—sink below the aircraft generating the turbulence.
2—rise into the traffic pattern.
3—rise into the takeoff or landing path of a crossing runway.
4—accumulate at the beginning of the takeoff roll.

4715. What effect would a light crosswind have on the wingtip vortices generated by a large airplane that had just taken off?

1—The upwind vortex would tend to remain on the runway longer than the downwind vortex.
2—A light crosswind would rapidly dissipate the strength of both vortices.
3—The downwind vortex would tend to remain on the runway longer than the upwind vortex.
4—Both vortices would move downwind at a greater rate than if the surface wind was directly down the landing runway.

4716. During a takeoff made behind a departing large jet airplane, the pilot can minimize the hazard of wingtip vortices by

1—being airborne prior to reaching the jet's flightpath until able to turn clear of its wake.
2—remaining below the jet's flightpath until able to turn clear of its wake.
3—maintaining extra speed on takeoff and climbout.
4—extending the takeoff roll and not rotating until well beyond the jet's rotation point.

4717. When landing behind a large jet aircraft, at which point on the runway should you plan to land?

1—If any crosswind, land on the downwind side of the runway and prior to the jet's touchdown point.
2—If any crosswind, land on the windward side of the runway and prior to the jet's touchdown point.
3—At least 1,000 ft. beyond the jet's touchdown point.
4—Beyond the jet's touchdown point.

4718. The most important rule to remember in the event of a power failure after becoming airborne is to

1—quickly check the fuel supply for possible fuel exhaustion.
2—determine the wind direction to plan for your forced landing.
3—turn back immediately to the takeoff runway.
4—maintain safe airspeed.

4719. If decompression occurs in a pressurized airplane, a pilot should

1—make a rapid descent to an appropriate lower altitude.
2—start a slow descent to a lower altitude to minimize passenger discomfort.
3—contact ATC on 121.5 MHz for permission to descend.
4—instruct each passenger to force air into the middle ear.

4720. How will an increase in weight (loading) affect the performance of an airplane?

1—The lift/drag ratio will change.
2—The glide ratio will decrease.
3—The power setting required to produce a specific airspeed will change.
4—The indicated stalling speed will decrease.

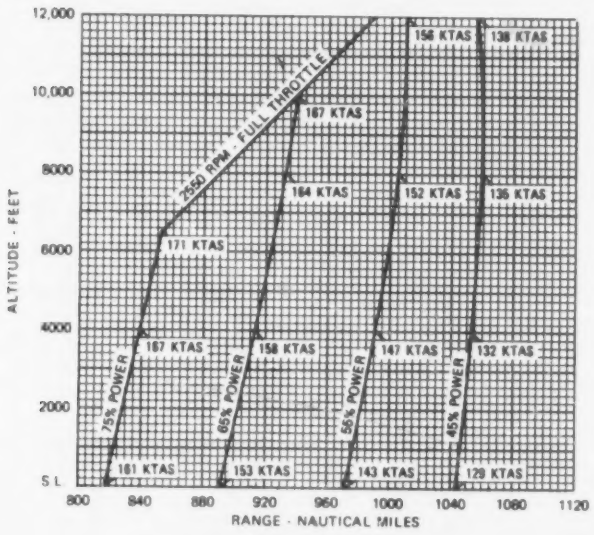
4721. After takeoff, which airspeed would permit the pilot to gain the most altitude in a given period of time?

1—Cruising climb speed.
2—Best rate-of-climb speed.
3—Best angle-of-climb speed.
4—Minimum control speed.

RANGE PROFILE
45 MINUTES RESERVE
534 LBS. USABLE FUEL

CONDITIONS:
3800 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTES:
1. This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb
2. Reserve fuel is based on 45 minutes at 45% BHP and is 44 lbs.



ENDURANCE PROFILE
45 MINUTES RESERVE
534 LBS. USABLE FUEL

CONDITIONS:
3800 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature

NOTES:
1. This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the time during a normal climb
2. Reserve fuel is based on 45 minutes at 45% BHP and is 44 lbs.

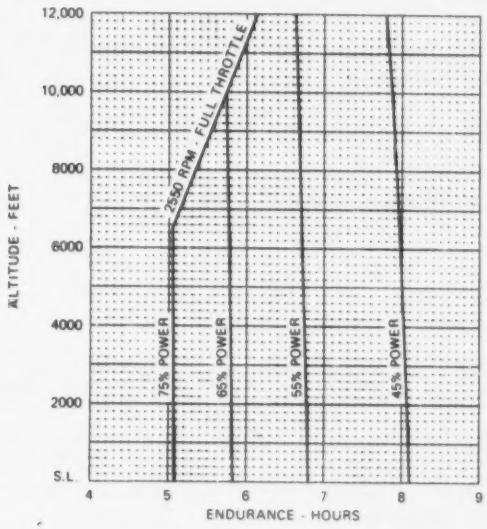


Figure 21

4722. Use the conditions and data on charts in Figure 21 for computations.

Altitude.....6,500 ft.
Power.....55 percent
Headwind component.....17 kts.

The range under the conditions given is

1—1,000 NM.
2—943 NM.
3—886 NM.
4—816 NM.

4723. Use the conditions and data on charts in Figure 21 for computations.

Altitude.....8,500 ft.
Power.....55 percent
Tailwind component.....22 kts.

The range under the conditions given is

1—957 NM.
2—1,005 NM.
3—1,152 NM.
4—1,222 NM.

4724. Use the conditions and data on charts in Figure 21 for computations.

Altitude.....5,500 ft.
Power.....45 percent
Tailwind component.....20 kts.

The range under the conditions given is

1—1,055 NM.
2—1,215 NM.
3—1,278 NM.
4—1,303 NM.

4725. Use the conditions and data on charts in Figure 21 for computations.

Altitude.....6,000 ft.
Power.....75 percent
Tailwind component.....17 kts.

The range under the conditions given is

1—1,019 NM.
2—937 NM.
3—850 NM.
4—817 NM.

4726. The following conditions exist at an airport of intended landing:

Landing Rwy.....30
Wind.....020° at 15 kts.

A pilot can determine that the crosswind component is approximately (see Figure 22)

1—22 kts.
2—4 kts.
3—15 kts.
4—20 kts.

4727. The following conditions exist at an airport of intended landing:

Landing Rwy.....3
Wind.....060° at 35 kts.

A pilot can determine that the crosswind component is approximately (see Figure 22)

1—22 kts.
2—10 kts.
3—12 kts.
4—18 kts.

4728. The following conditions exist at an airport of intended landing:

Landing Rwy.....13
Wind.....140° at 30 kts.

A pilot can determine that the crosswind component is approximately (see Figure 22)

1—18 kts.
2—5 kts.
3—10 kts.
4—15 kts.

4729. The following conditions exist at an airport of intended landing:

Landing Rwy.....22
Wind.....260° at 23 kts.

A pilot can determine that the crosswind component is approximately (see Figure 22)

1—25 kts.
2—10 kts.
3—15 kts.
4—20 kts.

4730. The maximum demonstrated crosswind component is equal to 0.2 V_{SO} and the following conditions exist at an airport of intended landing:

V_{SO}.....70 kts.
Landing Rwy.....35
Wind.....300° at 20 kts.

A pilot can determine that the (see Figure 22)

1—headwind component exceeds the crosswind component.
2—headwind component is excessive.
3—crosswind component is within safe limits.
4—maximum safe crosswind component is exceeded.

4731. The maximum demonstrated crosswind component is equal to 0.2 V_{SO} and the following conditions exist at an airport of intended landing:

V_{SO}.....60 kts.
Landing Rwy 12 Wind.....150° at 20 kts.

A pilot can determine that the (see Figure 22)

1—crosswind component exceeds the headwind component.
2—headwind component is excessive.
3—crosswind component is within safe limits.
4—maximum safe crosswind component is exceeded.

4732. The maximum demonstrated crosswind component is equal to 0.2 V_{SO} and the following conditions exist at an airport of intended landing:

V_{SO}.....65 kts.
Landing Rwy 17 Wind.....200° at 30 kts.

A pilot can determine that the (see Figure 22)

1—crosswind component exceeds the headwind component.
2—maximum safe crosswind component is exceeded.
3—crosswind component is within safe limits.
4—headwind component is excessive.

WIND COMPONENTS

EXAMPLE:

WIND SPEED	10 KNOTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	20°
HEADWIND COMPONENT	9.5 KNOTS
CROSSWIND COMPONENT	3.5 KNOTS

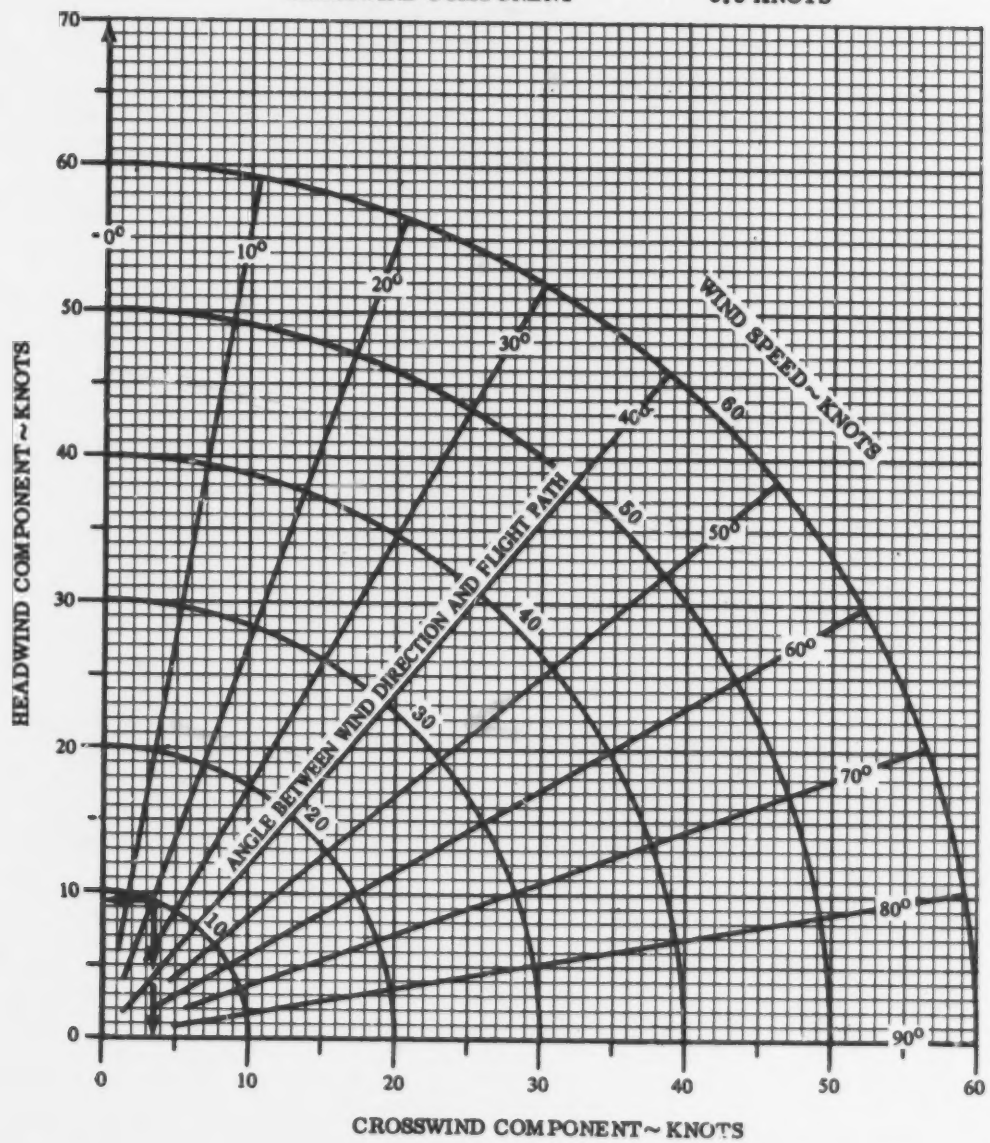


Figure 22

4733. GIVEN:

Airport elevation ..... 5,515 ft.
OAT ..... 85° F
Altimeter setting ..... 29.40" Hg

Determine the density altitude (see Figure 23).

1—9,250 ft.
2—9,050 ft.
3—8,400 ft.
4—6,000 ft.

4734. GIVEN:

Airport elevation ..... 3,795 ft.
OAT ..... 75° F
Altimeter setting ..... 29.70" Hg

Determine the density altitude (see Figure 23).

1—6,200 ft.
2—5,900 ft.
3—3,900 ft.
4—3,000 ft.

4735. GIVEN:

Airport elevation ..... 3,450 ft.
OAT ..... 95° F
Altimeter setting ..... 30.40" Hg

Determine the density altitude (see Figure 23).

1—7,200 ft.
2—7,650 ft.
3—6,650 ft.
4—5,950 ft.

4736. Which statement is true regarding takeoff performance with high density altitude conditions?

1—The acceleration rate is slower because the engine and propeller efficiency is reduced.
2—The acceleration rate will increase since the lighter air creates less drag.
3—A shorter distance is required to accelerate to lift-off speed due to the reduced drag of lighter air.
4—A higher than normal indicated airspeed is required to produce sufficient lift since the air is less dense.

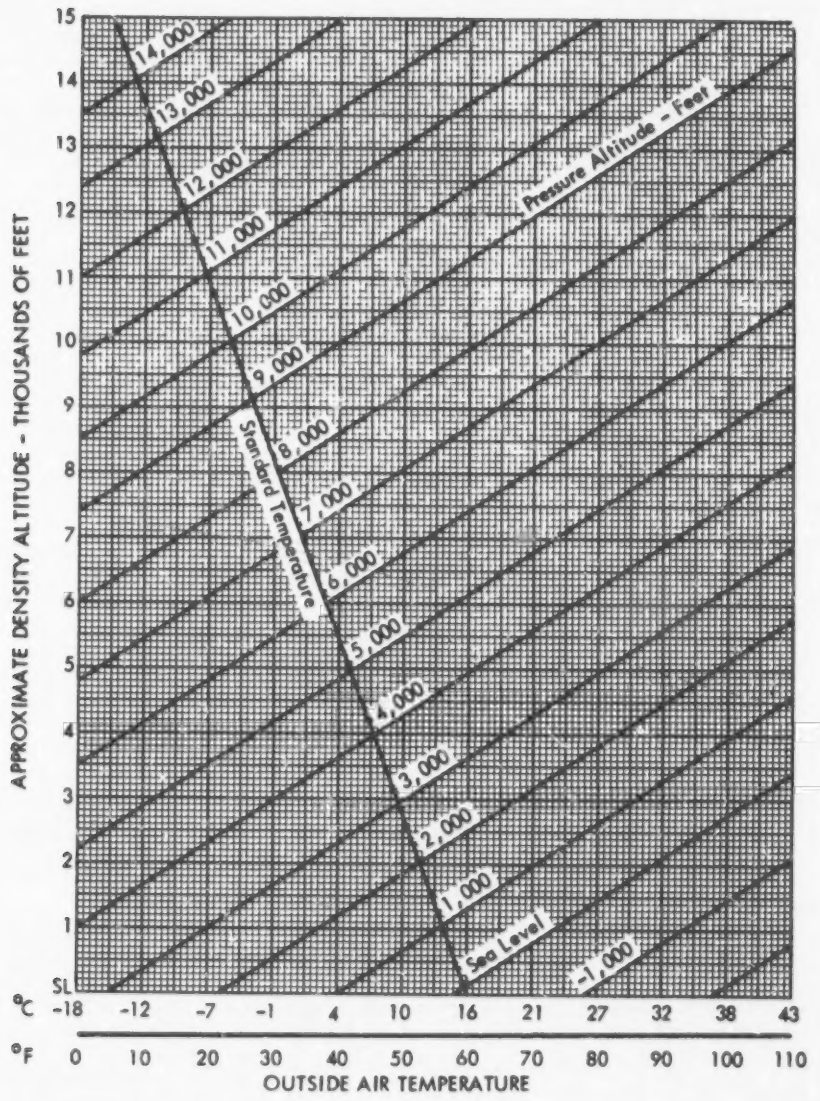
4737. If the atmospheric pressure and temperature remain the same, how would an increase in humidity affect takeoff performance?

1—Shorter takeoff distance; the air is less dense.
2—Longer takeoff distance; the air is more dense.
3—Longer takeoff distance; the air is less dense.
4—Shorter takeoff distance; the air is more dense.

4738. How does increased weight affect the takeoff distance of an airplane?

1—Every airplane has the same acceleration factor under the same atmospheric conditions, but a higher airspeed is needed to produce the additional lift required.
2—Every airplane has the same acceleration factor with the same power output, but a higher airspeed is needed to overcome the increased ground effect.
3—The airplane will accelerate more slowly with the same power output, and a higher airspeed is required to generate necessary lift for takeoff.
4—The airplane will accelerate more slowly with the same power output, but the same airspeed is required to generate necessary lift for takeoff.

DENSITY ALTITUDE CHART



Altimeter Setting (In. Hg.)	*Pressure Altitude Conversion Factor*
28.0	1,824
28.1	1,727
28.2	1,630
28.3	1,533
28.4	1,436
28.5	1,340
28.6	1,244
28.7	1,148
28.8	1,053
28.9	957
29.0	863
29.1	768
29.2	673
29.3	579
29.4	485
29.5	392
29.6	298
29.7	205
29.8	112
29.9	20
29.92	0
30.0	-73
30.1	-165
30.2	-257
30.3	-348
30.4	-440
30.5	-531
30.6	-622
30.7	-712
30.8	-803
30.9	-893
31.0	-983

Figure 23

FUEL CONSUMPTION VS BRAKE HORSEPOWER

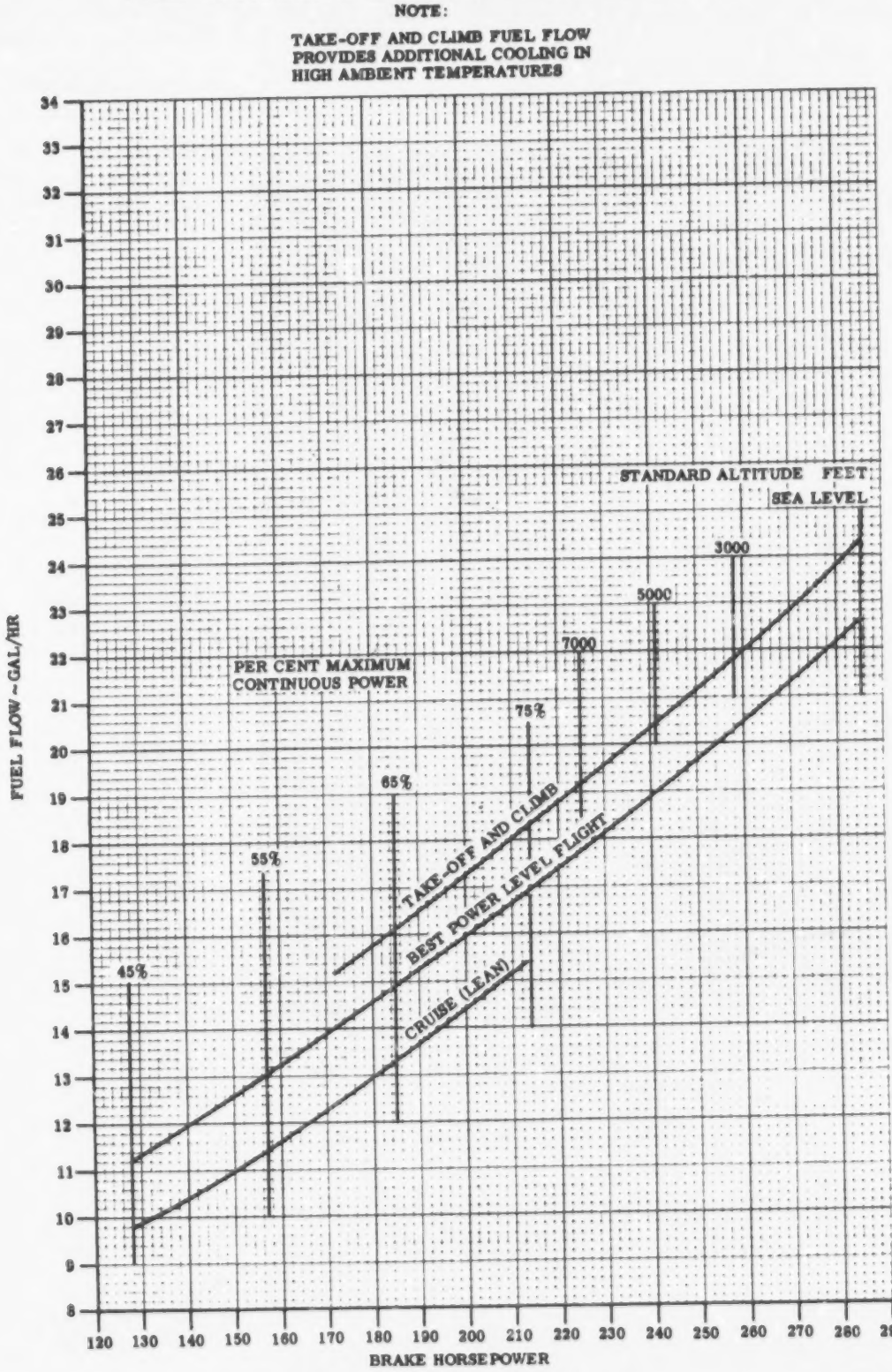


Figure 24

4739. How much flight time would be available and still have a 30-minute fuel reserve? (See Figure 24.)

Fuel qty.....55 gal.
Power-cruise (lean).....65 percent

1—2 hr. 19 min.
2—2 hr. 49 min.
3—3 hr. 38 min.
4—4 hr. 5 min.

4740. Determine the amount of fuel consumed during takeoff and climb at 75 percent power for 15 min. (See Figure 24.)

1—3.85 gal.
2—4.6 gal.
3—38.5 gal.
4—46 gal.

4741. Determine the brake horsepower and fuel flow during takeoff from an airport with an elevation of 1,500 ft. (See Figure 24.)

1—128 bhp and 9.8 GPH.
2—272 bhp and 23.1 GPH.
3—284 bhp and 22.8 GPH.
4—285 bhp and 24.3 GPH.

4742. Determine the brake horsepower and fuel flow during takeoff from an airport with an elevation of 2,250 ft. (See Figure 24.)

1—172 bhp and 15.2 GPH.
2—265 bhp and 22.4 GPH.
3—285 bhp and 21.0 GPH.
4—285 bhp and 24.3 GPH.

4743. GIVEN:

Height above terrain.....12,000 ft.
Headwind.....20 kts.

What is the approximate glide distance? (See Figure 25.)

1—26 mi.
2—24 mi.
3—23 mi.
4—21 mi.

4744. GIVEN:

Height above terrain.....5,500 ft.
Tailwind.....10 kts.

What is the approximate glide distance? (See Figure 25.)

1—13 mi.
2—12 mi.
3—11 mi.
4—10 mi.

4745. GIVEN:

Height above terrain.....7,500 ft.
Headwind.....30 kts.

What is the approximate glide distance? (See Figure 25.)

1—16 mi.
2—13 mi.
3—11 mi.
4—9 mi.

4746. GIVEN:

Height above terrain.....10,500 ft.
Tailwind.....20 kts.

What is the approximate glide distance? (See Figure 25.)

1—28 mi.
2—26 mi.
3—24 mi.
4—22 mi.

GLIDE DISTANCE

ASSOCIATED CONDITIONS:

GEAR	UP
FLAPS	UP
COWL FLAPS	CLOSED
PROPELLER	FULL HIGH PITCH (LOW RPM)
GLIDE SPEED	123 MPH IAS

NOTES 1. INCREASE GLIDE DISTANCE APPROXIMATELY 10% FOR EACH 10 KNOTS OF TAIL WIND.
2. DECREASE GLIDE DISTANCE APPROXIMATELY 10% FOR EACH 10 KNOTS OF HEADWIND

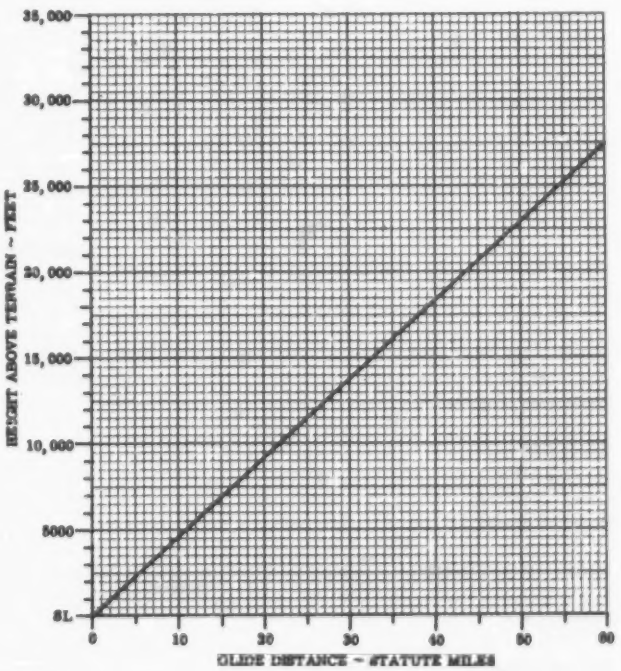


Figure 25

MAXIMUM CLIMB

CLIMB SPEED

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
WEIGHT	3400 POUNDS
GEAR	UP
FLAPS	UP

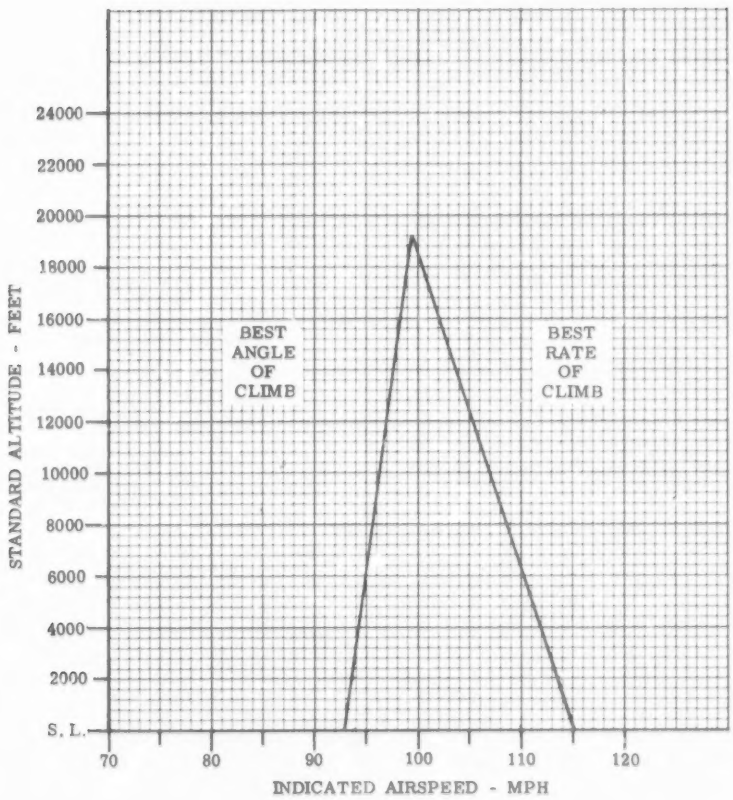


Figure 26

4747. The indicated airspeed that would give the greatest gain in altitude in a unit of time at 3,200 ft. is determined to be (see Figure 26)

1—93 MPH.
2—94 MPH.
3—113 MPH.
4—115 MPH.

4748. What indicated airspeed at 3,000 ft. would result in the greatest increase in altitude for a given distance? (See Figure 26.)

1—94 MPH.
2—113 MPH.
3—115 MPH.
4—119 MPH.

4749. To maintain the best rate of climb, the indicated speed should be (see Figure 26)

1—reduced approximately .8 MPH per 1,000 ft. of altitude.
2—increased at least 1 MPH per 1,000 ft. of altitude.
3—maintained at a constant value during the climb.
4—adjusted to maintain the specified rate of climb.

4750. During a climb under the given conditions, an indicated airspeed of 95 MPH at 6,000 ft. will provide the (see Figure 26)

1—greatest gain of altitude in a 1-minute period.
2—greatest gain of altitude for each mile of forward travel.
3—fastest gain of altitude in a given time period.
4—steepest climb angle from that altitude upward.

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NORMAL LANDING

ASSOCIATED CONDITIONS:

POWER	AS REQUIRED TO MAINTAIN 800 FT/MIN DESCENT ON APPROACH
FLAPS	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX. 53% OF TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	75° F.
PRESSURE ALTITUDE	4000 FT
LANDING WEIGHT	3200 LBS
HEAD WIND	10 KNOTS
TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE	1475 FT
GROUND ROLL (53% OF 1475)	782 FT
IAS APPROACH SPEED	87 MPH IAS

WEIGHT POUNDS	IAS APPROACH SPEED (ASSUMES ZERO INSTR. ERROR)	
	MPH	KNOTS
3400	90	78
3200	87	76
3000	84	73
2800	81	70
2600	78	68
2400	75	65

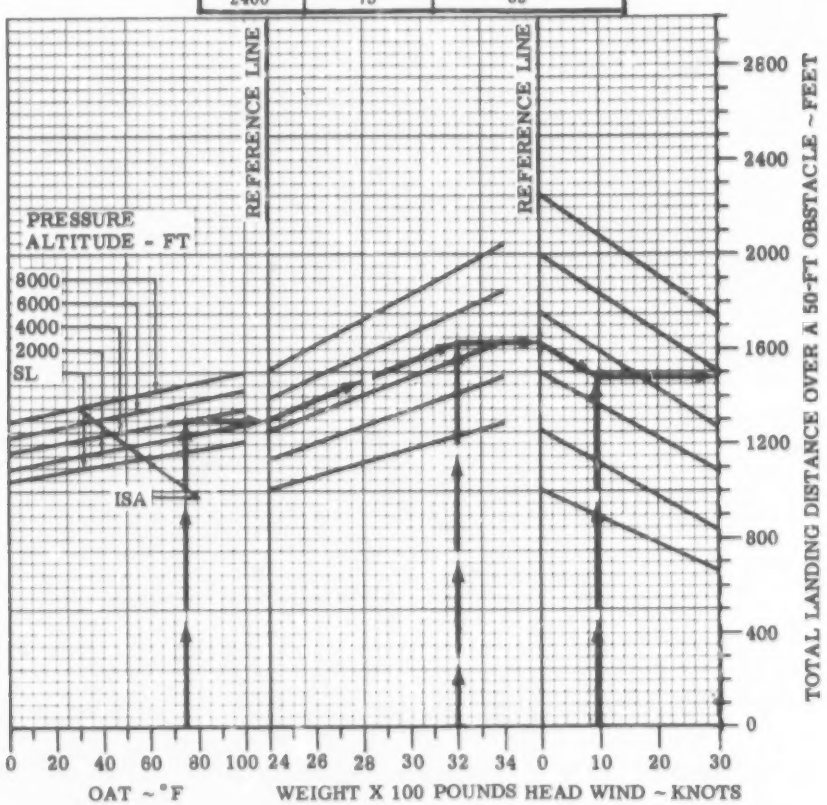


Figure 27

4751. What is the total landing distance over a 50-foot obstacle? (See Figure 27.)

Temperature	50° F
Pressure altitude	4,000 ft.
Wt.	3,000 lb.
Headwind	22 kts.

1—1,250 ft.
2—1,175 ft.
3—1,050 ft.
4—975 ft.

4752. Determine the approximate ground roll. (See Figure 27.)

Temperature	85° F
Pressure altitude	6,000 ft.
Wt.	2,800 lb.
Headwind	14 kts.

1—1,480 ft.
2—1,280 ft.
3—742 ft.
4—634 ft.

4753. What is the total landing distance over a 50–foot obstacle? (See Figure 27.)

Temperature.....90° F
Pressure altitude.....2,000 ft.
Wt.....3,400 lb.
Headwind.....10 kts.

1—1,725 ft.
2—1,650 ft.
3—1,575 ft.
4—1,475 ft.

4754. Determine the approximate ground roll. (See Figure 27.)

Temperature.....60° F
Pressure altitude.....8,000 ft.
Wt.....3,200 lb.
Headwind.....18 kts.

1—1,500 ft.
2—1,050 ft.
3—795 ft.
4—650 ft.

4755. Determine the ground run required for takeoff. (See Figure 28.)

Temperature.....71°
Pressure Altitude.....3,500 ft.
Wt.....2,600 lb.
Headwind.....25 MPH

1—129 ft.
2—183 ft.
3—223 ft.
4—311 ft.

4756. Determine the ground run required for takeoff. (See Figure 28.)

Temperature.....77°
Pressure Altitude.....2,000 ft.
Wt.....2,200 lb.
Headwind.....20 MPH

1—106 ft.
2—216 ft.
3—310 ft.
4—389 ft.

4757. Determine the takeoff distance required to clear a 50–foot obstacle. (See Figure 28.)

Temperature.....72° F
Pressure Altitude.....3,200 ft.
Wt.....2,300 lb.
Headwind.....15 MPH

1—553 ft.
2—606 ft.
3—668 ft.
4—754 ft.

4758. Determine the takeoff distance required to clear a 50–foot obstacle. (See Figure 28.)

Temperature.....62° F
Pressure Altitude.....6,000 ft.
Wt.....2,700 lb.
Headwind.....15 MPH

1—893 ft.
2—995 ft.
3—1,041 ft.
4—1,145 ft.

TAKE-OFF DATA

TAKE-OFF DISTANCE WITH 20° FLAPS FROM HARD-SURFACED RUNWAY

GROSS WEIGHT LBS.	IAS AT 50 FT. MPH	HEAD WIND MPH	AT SEA LEVEL & 59°F		AT 2500 FEET & 50°F		AT 5000 FT. & 41°F		AT 7500 FT. & 32 F	
			GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE
2200	55	0	345	680	405	770	480	885	580	1040
		15	205	460	245	525	295	615	365	725
		30	100	275	120	320	155	380	195	460
2600	60	0	500	915	585	1045	705	1230	855	1470
		15	310	635	370	735	455	870	560	1055
		30	165	395	200	465	255	565	325	695
3000	64	0	695	1210	820	1405	990	1675	1205	2045
		15	450	855	535	1006	660	1215	815	1505
		30	250	555	310	665	390	820	500	1030

NOTE: INCREASE DISTANCES 10% FOR EACH 25°F ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

Figure 28

4759. The gear is down and the flaps are set at 15°. If the angle of bank is 0°, what would be the indicated stall speed? (See Figure 29.)

1—71 MPH.
2—80 MPH.
3—84 MPH.
4—88 MPH.

4760. If the bank angle is 60°, the gear is down, and the flaps are set at 45°, what would be the indicated stall speed? (See Figure 29.)

1—84 MPH.
2—93 MPH.
3—106 MPH.
4—110 MPH.

4761. What would be the approximate indicated stall speed during a 40° bank with the gear down and flaps set at 15°? (See Figure 29.)

1—92 MPH.
2—90 MPH.
3—88 MPH.
4—80 MPH.

4762. With the gear down and flaps set at 45°, what would be the indicated stall speed if the angle of bank is 40°? (See Figure 29.)

1—80 MPH.
2—83 MPH.
3—87 MPH.
4—90 MPH.

4763. Under which conditions is hydroplaning most likely to occur?

1—During heavy precipitation of rain or wet snow and a landing is made at minimum landing speed and abrupt initial runway contact.
2—When rudder is used for directional control instead of allowing the nosewheel to contact the surface early in the landing roll on a wet runway.
3—During conditions of standing water, slush, high speed, and smooth runway texture.
4—During a landing on any wet runway when brake application is delayed until a wedge of water begins to build ahead of the tires.

4764. The center of gravity of an aircraft can be determined by

1—multiplying total weight by total moments.
2—dividing total arms by total moments.
3—dividing total moments by total weight.
4—multiplying total arms by total weight.

4765. If the landing gear on an airplane moves forward during retraction, the

1—total moments will decrease.
2—total moments will remain the same.
3—total moments will increase.
4—center of gravity will remain the same.

4766. What is a definition of zero fuel weight?

1—Basic operating weight plus maximum capacity of passengers and cargo.
2—Empty weight plus passengers and cargo.
3—Takeoff weight minus fuel to destination and alternate.
4—Basic operating weight plus payload.

4767. The center of gravity of an airplane is computed along the

1—lateral axis.
2—vertical axis.
3—longitudinal axis.
4—horizontal axis.

4768. If the nosewheel of an airplane moves forward upon gear retraction, would this forward movement affect the CG location of that airplane?

1—Yes; the CG would move aft.
2—Yes, but the CG movement would be unpredictable.
3—No; the CG would not move.
4—Yes; the CG would move forward.

4769. If the landing gear of an airplane moves rearward when retracting, would this affect the CG?

1—No; the CG location would remain the same.
2—Yes, but the CG movement would be unpredictable.
3—Yes; the CG would move aft.
4—Yes; the CG would move forward.

4770. GIVEN:

Weight "X" — 130 lb. at 17" aft of datum
Weight "Y" — 110 lb. at 110" aft of datum
Weight "Z" — 75 lb. at 210" aft of datum

Based on this information, the center of gravity would be located how far aft of datum?

1—89.1".
2—95.4".
3—106.9".
4—112.3".

4771. GIVEN:

Weight "D" — 160 lb. at 45" aft of datum
Weight "E" — 170 lb. at 145" aft of datum
Weight "F" — 105 lb. at 185" aft of datum

Based on this information, where would the center of gravity be located?

1—86.0" aft of datum.
2—117.8" aft of datum.
3—125.0" aft of datum.
4—136.7" aft of datum.

4772. GIVEN:

Weight "A" — 120 lb. at 15" aft of datum
Weight "B" — 200 lb. at 117" aft of datum
Weight "C" — 75 lb. at 195" aft of datum

Based on this information, the center of gravity would be located how far aft of datum?

1—82.0".
2—109.0".
3—121.7".
4—100.8".

AIRSPEED CORRECTION TABLE

Flaps 0°		Flaps 15°*		Flaps 45°**	
IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH
80	84	70	79	70	78
100	102	80	86	80	84
120	123	90	94	90	93
140	141	100	103	100	103
160	161	110	113	110	111
180	181	120	121	120	130
200	201	130	131	130	139
220	221	140	141	140	138
240	242	150	151		
		160	161		

* Maximum Flap Speed 160 MPH ** Maximum Flap Speed 140 MPH

Note: CAS is identical to TIAS.

STALL SPEED CHART

MPH - CAS
4990 POUNDS GROSS WEIGHT

CONFIGURATION	ANGLE OF BANK			
	0°	20°	40°	60°
Gear and Flaps Up	84	87	97	110
Gear Down and Flaps 15°	80	83	93	113
Gear Down and Flaps 45°	76	79	87	106

Figure 29

4773. GIVEN:

Empty weight (oil is included)	2,260.0 lb.
Empty weight moment	93.2 lb.–in.
Pilot & front seat passenger	400 lb.
Center passengers	400 lb.
Aft passengers	340 lb.
Baggage	120 lb.
Fuel	89 gal.

Use Figure 30. Is the airplane loaded within limits?

1—No, the weight exceeds the maximum allowable by 254 lb., and the CG is aft of the aft limit.
2—No, the weight is acceptable, but the CG is aft of the aft limit.
3—Yes, the weight and CG would be within limits after 254 lb. of fuel were consumed.
4—Yes, the weight and CG location is acceptable.

4774. GIVEN:

Empty weight (oil is included)	2,260.0 lb.
Empty weight moment	93.2 lb.–in.
Pilot and front seat passenger	380 lb.
Center passengers	240 lb.
Aft passengers	220 lb.
Baggage	120 lb.
Fuel	75 gal.

Under the conditions listed above and using Figure 30, the CG is determined to be located

1—within the CG envelope.
2—on the forward limit of the CG envelope.
3—on the aft limit of the CG envelope.
4—within the shaded area of the CG envelope.

4775. Use Figure 30.

GIVEN:

Empty weight moment	99.7
Empty wt. (oil not included)	2,288.0 lb.
Oil	8 qt.
Oil Moment	–0.2
Pilot & front seat passenger	330.0 lb.
Center passengers	290 lb.
Aft passengers	170 lb.
Baggage	120 lb.
Fuel	70 gal.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 60.0 gal. of fuel have been used during flight?

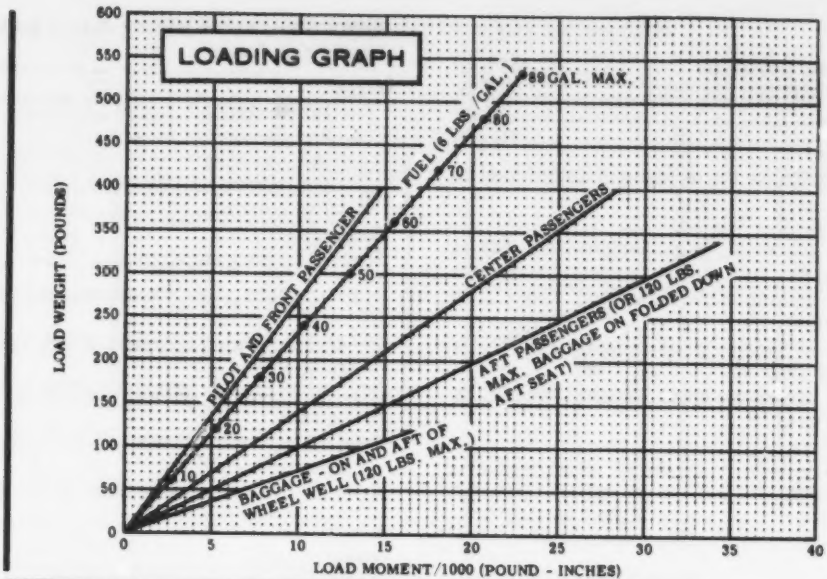
1—Weight 3,618.0 lb.; moment 168.8.
2—Weight 3,618.0 lb.; moment 184.5.
3—Weight 3,273.0 lb.; moment 168.8.
4—Weight 3,273.0 lb.; moment 184.5.

4776. GIVEN:

Empty weight (oil is included)	2,276.0 lb.
Empty weight moment	90.2 lb.–in.
Pilot & front seat passenger	400 lb.
Center passengers	200 lb.
Aft passengers	175 lb.
Baggage	35 lb.
Fuel	80 gal.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 70.0 gal. of fuel have been used during flight? (See Figure 30.)

1—3,131 lb. and 144.5 lb.–in.
2—3,146 lb. and 144.7 lb.–in.
3—3,566 lb. and 162.7 lb.–in.
4—3,986 lb. and 180.7 lb.–in.


LOADING GRAPH
LOAD WEIGHT (POUNDS)
LOAD MOMENT/1000 (POUND - INCHES)
FUEL (6 LBS./GAL.)
89 GAL. MAX.
PILOT AND FRONT PASSENGER
CENTER PASSENGERS
AFT PASSENGERS (OR 120 LBS. MAX. BAGGAGE ON FOLDED DOWN AFT SEAT)
BAGGAGE - ON AND AFT OF WHEEL WELL (120 LBS. MAX.)

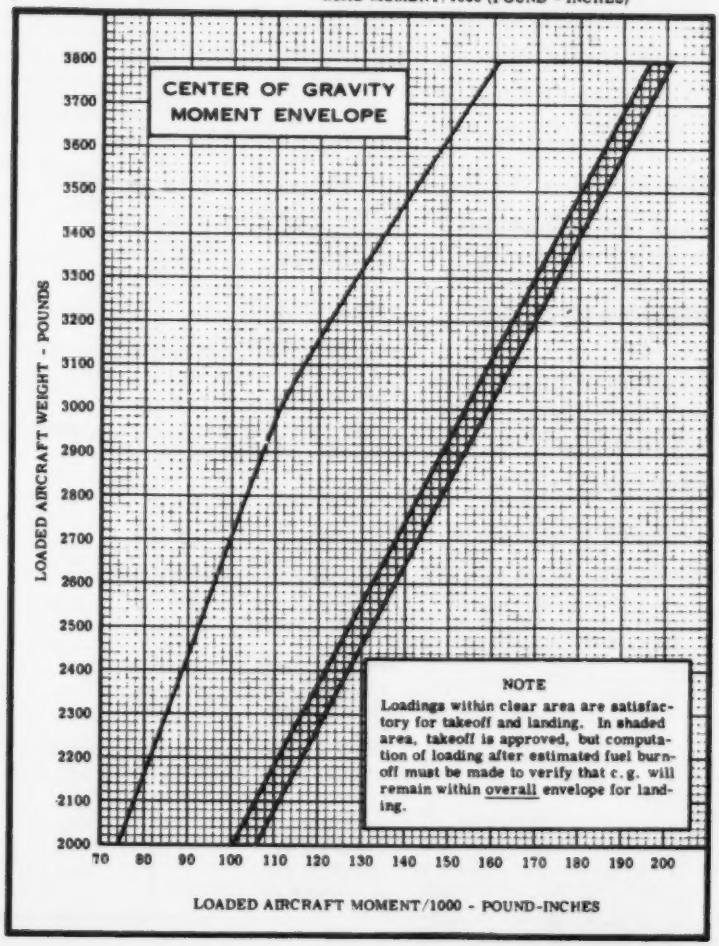

CENTER OF GRAVITY MOMENT ENVELOPE
LOADED AIRCRAFT WEIGHT - POUNDS
LOADED AIRCRAFT MOMENT/1000 - POUND-INCHES
NOTE
Loadings within clear area are satisfactory for takeoff and landing. In shaded area, takeoff is approved, but computation of loading after estimated fuel burn-off must be made to verify that c.g. will remain within overall envelope for landing.

Figure 30

READEX FICHE

4777. GIVEN:

Front seat — pilot and passenger.....375 lb.
Rear seat — passengers (aft position).....245 lb.
Baggage.....65 lb.
Fuel.....70 gal.

Using the data in Figure 31 the airplane is determined to be

1—185 lb. under allowable gross weight; the CG is located within limits.
2—162 lb. under allowable gross weight; the CG is located within limits.
3—162 lb. under allowable gross weight; the CG is located aft of the aft limit.
4—692 lb. under allowable gross weight; the CG is located within limits.

4778. Use the loading data in Figure 31. What would be the maximum allowable inches aft of datum center of gravity moment if the airplane was loaded to 3,400 lb. gross weight?

1—77.0 in.
2—82.0 in.
3—84.5 in.
4—85.8 in.

4779. GIVEN:

Front seat — pilot and passenger.....400 lb.
Rear seat — (aft position)
— passengers.....240 lb.
Baggage.....20 lb.
Fuel.....75 gal.

Using the data in Figure 31, the airplane is determined to be

1—157 lb. under allowable gross weight, but the CG is located aft of the aft limit.
2—157 lb. under allowable gross weight; the CG is located within limits.
3—180 lb. under allowable gross weight; the CG is located within limits.
4—180 lb. under allowable gross weight, but the CG is located aft of the aft limit.

4780. Refer to the loading data, Figure 31; an airplane is loaded as follows:

Front
— 1st person.....160 lb.
— 2nd person.....156 lb.
Rear (Aft position)
— 1st person.....130 lb.
— 2nd person.....147 lb.
Baggage.....50 lb.
Fuel — Leading edge tanks.....75 gal.

From the data given, the airplane is loaded

1—156 lb. under allowable gross weight; CG 84″ aft of datum.
2—163 lb. under allowable gross weight; CG 82″ aft of datum.
3—197 lb. under allowable gross weight; CG 84.5″ aft of datum.
4—197 lb. under allowable gross weight; CG located outside aft limits.

4781. GIVEN:

Aircraft weight.....8,300 lb.
CG location.....Station 90.0
Aft CG limit.....Station 90.5

How much weight could be added at station 160 without exceeding the aft CG limit?

1—13.9 lb.
2—16.5 lb.
3—59.7 lb.
4—69.5 lb.

4782. GIVEN:

Aircraft weight.....9,500 lb.
CG location.....Station 90.0
Aft CG limit.....Station 90.5

How much weight could be added at station 120 without exceeding the aft CG limit?

1—30.0 lb.
2—61.0 lb.
3—110.5 lb.
4—161.0 lb.

4783. GIVEN:

Aircraft weight.....5,000 lb.
CG location.....Station 80.0
Aft CG limit.....Station 80.5

What is the maximum weight that could be added at station 150.0 without exceeding the aft CG limit?

1—35.9 lb.
2—69.5 lb.
3—70.0 lb.
4—160.5 lb.

USEFUL LOAD WEIGHTS AND MOMENTS

FUEL LEADING EDGE TANKS ARM 75					
Gallons	Weight	Moment	Gallons	Weight	Moment
5	30	23	45	270	203
10	60	45	49	294	221
15	90	68	55	330	248
20	120	90	60	360	270
25	150	113	65	390	293
30	180	135	70	420	315
35	210	158	75	450	338
40	240	180	80	480	360

OIL ARM 25		
Quarts	Weight	Moment
12	23	6

BAGGAGE ARM 150	
Weight	Moment
10	15
20	30
30	45
40	60
50	75
60	90
70	105
80	120
90	135
100	150
110	165
120	180
130	195
140	210
150	225
160	240
170	255
180	270
190	285
200	300
210	315
220	330
230	345
240	360
250	375
260	390
270	405

NOTE: All moments are equal to $\frac{\text{weight X arm}}{100}$

OCCUPANTS				
Front Seats ARM 85		Rear Seats		
			Fwd. Position ARM 121	Aft Position ARM 136
Weight	Moment	Weight	Moment	Moment
120	102	120	145	163
130	111	130	157	177
140	119	140	169	190
150	128	150	182	204
160	136	160	194	218
170	145	170	206	231
180	153	180	218	245
190	162	190	230	258
200	170	200	242	273

EMPTY WEIGHT DATA		
OIL INCLUDED	Empty Weight (Lbs.)	Empty Weight Moment (/100)
Certificated Weight	2110	1652

GROSS WEIGHT MOMENT LIMITS

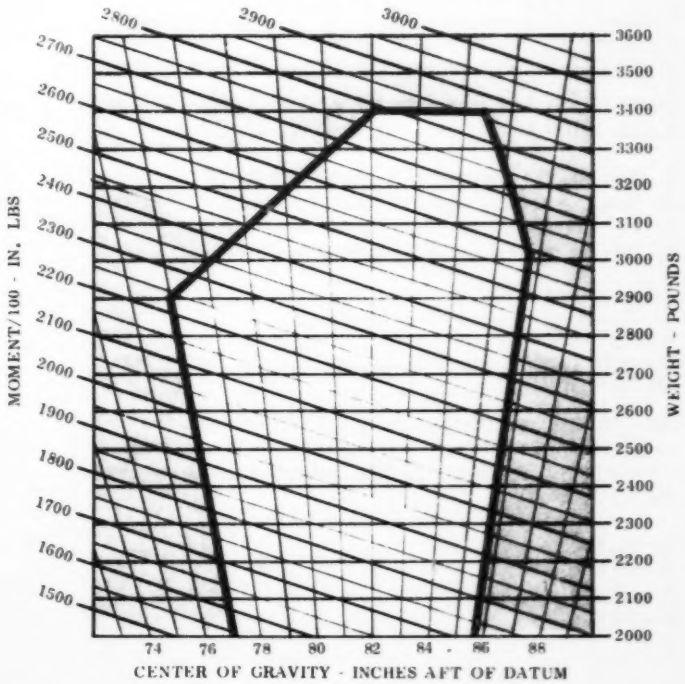


Figure 31

4784. GIVEN:

Aircraft weight.....6,230 lb.
CG location.....Station 79

What is the location of the CG if 90 lb. are removed from station 140?

1—79.9.
2—78.1.
3—80.1.
4—77.9.

4785. GIVEN:

Aircraft weight.....7,152 lb.
CG location.....Station 82

What is the location of the CG if 146 lb. are removed from Station 150?

1—83.4.
2—82.7.
3—81.3.
4—80.6.

4786. GIVEN:

Aircraft weight.....8,420 lb.
CG location.....Station 85

What is the location of the CG if 60 lb. are removed from Station 70?

1—94.3.
2—85.1.
3—84.9.
4—84.1.

4787. GIVEN:

Total wt.....4,750 lb.
CG location.....Station 115.8
Aft CG limit.....Station 118.0

Could 100 lb. of baggage be shifted from station 30.0 to station 120.0 without exceeding the aft CG limit?

1—Yes, the CG would remain at station 115.8.
2—Yes, the new CG would be located at station 117.69.
3—No, the new CG would be located at station 118.15.
4—No, the new CG would be located at station 118.25.

4788. GIVEN:

Total wt.....7,500 lb.
CG location.....Station 80.5
Aft CG limit.....Station 79.5

How much cargo (weight) must be shifted from the aft cargo compartment at station 150.0 to the forward cargo compartment at station 30.0 to move the CG to exactly the aft CG limit?

1—62.5 lb.
2—65.8 lb.
3—68.9 lb.
4—73.5 lb.

4789. GIVEN:

Total wt.....2,800 lb.
CG location.....Station 120.0
Fwd. CG limit.....Station 117.0

Could 100 lb. of baggage be shifted from station 130.0 to station 30.0 without exceeding the forward CG limit?

1—No, the new CG would be located at station 116.42.
2—No, the new CG would be located at station 116.89.
3—Yes, the new CG would be located at station 117.89.
4—Yes, the new CG would remain at station 120.0.

4790. Which technique should a student be taught to scan for traffic to the right and left during straight-and-level flight?

1—Systematically focus on different segments of the sky for short intervals.
2—Concentrate on relative movement detected in the peripheral vision area.
3—Continuous sweeping of the windshield from right to left.
4—Concentrate on traffic ahead and to the right because traffic to the left must give right of way.

4791. What effect does haze have on the ability to see traffic or terrain features during flight?

1—Haze causes the eyes to focus at infinity.
2—The eyes tend to overwork in haze and do not detect relative movement easily.
3—Contrasting colors become less distinct making objects more difficult to see.
4—All traffic or terrain features appear to be farther away than their actual distance.

4792. What is an effective way to prevent a collision hazard in the traffic pattern?

1—Enter the pattern in a descent.
2—Maintain the proper traffic pattern altitude and continually scan the area.
3—Rely on radio reports from other aircraft who may be operating in the traffic pattern.
4—Execute S turns during the entire traffic pattern to assist in scanning.

APPENDIX 2

The abbreviations listed below are used to identify the reference associated with each test question listed in Appendix 1.

AC — Advisory Circular
ACL — Aeronautical Chart Legend
AFD — Airport Facility Directory
AIM — Airman's Information Manual
FAR — Federal Aviation Regulations
NAVWEP — Aerodynamics for Naval Aviators
NTSB — National Transportation Safety Board
PAN — Practical Air Navigation
VEOG — VFR Exam-O-Grams

Item	*Reference*	*Item*	*Reference*	*Item*	*Reference*	*Item*	*Reference*
4001.	AC 60–14	**4031.**	AC 60–14	**4061.**	AC 60–14	**4091.**	AC 60–14
4002.	AC 60–14	**4032.**	AC 60–14	**4062.**	AC 60–14	**4092.**	AC 60–14
4003.	AC 60–14	**4033.**	AC 60–14	**4063.**	AC 60–14	**4093.**	AC 60–14
4004.	AC 60–14	**4034.**	AC 60–14	**4064.**	AC 60–14	**4094.**	AC 60–14
4005.	AC 60–14	**4035.**	AC 60–14	**4065.**	AC 60–14	**4095.**	AC 60–14
4006.	AC 60–14	**4036.**	AC 60–14	**4066.**	AC 60–14	**4096.**	AC 60–14
4007.	AC 60–14	**4037.**	AC 60–14	**4067.**	AC 60–14	**4097.**	AC 60–14
4008.	AC 60–14	**4038.**	AC 60–14	**4068.**	AC 60–14	**4098.**	AC 60–14
4009.	AC 60–14	**4039.**	AC 60–14	**4069.**	AC 60–14	**4099.**	AC 60–14
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